Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

Geotechnical Investigation, Engineering, & Design

Shoring Design & Earth Retention Systems

Pavement Evaluation & Design

Environmental Assessment & Remediation Services

Hydrogeology

Building Systems & Sciences

Construction Materials Engineering Inspection & Testing

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CCIL Certified Concrete Testing

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CWB Certified Welding & Structural Steel

File No. 1-19-0719-46
Brampton Office

July 13, 2020

Ranee Management
4122 Bathurst Street
North York, Ontario
M3H 3P2

Attention: Ilana Glickman

RE: HYDROGEOLOGICAL ASSESSMENT REPORT
2570-2590 ARGYLE ROAD
MISSISSAUGA, ONTARIO

Dear Ilana Glickman:

Terraprobe Inc. is pleased to provide Ranee Management with the result of the hydrogeological assessment for 2570-2590 Argyle Road, Mississauga, Ontario. The following document is provided as part of this package:

- Hydrogeological Assessment Report

The hydrogeological assessment report includes findings for groundwater monitoring program, groundwater quality assessment, and short-term construction and long-term post construction dewatering flow rate estimations.

If you have any questions or concerns regarding either of the documents, please do not hesitate to contact the undersigned.

Yours truly,
Terraprobe Inc.

Mahmoud Meskar. Ph.D., P.Eng.
Project Engineer

Narjes Alijani, M.Sc., P.Geo.
Project Manager

Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGICAL ASSESSMENT
2570-2590 Argyle Road
MISSISSAUGA, ONTARIO
L5B 1V2

Prepared For: Ranee Management
4122 Bathurst Street
North York, Ontario
M3H 3P2

Attention: Ms. Ilana Glickman

File No. 1-19-0719-46
July 13, 2020

EXECUTIVE SUMMARY

Terraprobe Inc. was retained by Ranee Management to conduct a Hydrogeologic Assessment at the property located at 2570-2590 Argyle Road, Mississauga, Ontario (the Site). This report was prepared to estimate the potential short-term construction dewatering and long-term (post construction) foundation drainage requirements associated with the proposed redevelopment. Furthermore, groundwater quality was assessed in comparison to the Region of Peel Sanitary and Storm Sewer Use By-Law limits to provide comments on discharge options.

The Site is located on the south side of Dundas Street West, approximately 100 m to the south of the intersection of Dundas Street West and Parkerhill Road in the City of Mississauga, Ontario. The Site is an active apartment complex that currently comprises of two (2) 12-storey residential towers with municipal addresses of 2570 Argyle Road and 2590 Argyle Road, in the City of Mississauga. It includes asphalt-paved parking lots, and landscaped area. Both towers have one (1) level of basement and at-grade parking lots. The current conditions of the Site are presented in **Table I**.

Table I: Existing Buildings

Municipal Address	Above Grade Levels	Below Grade Levels
2570 Argyle Road (Building A)	12	1 Basement Level
2590 Argyle Road (Building B)	12	1 Basement Level

A review of the "Preliminary Site Grading Plan" prepared by Crozier Consulting Engineers dated June 23, 2020, south portion of the Site, which is currently occupied by at-grade parking lots, will be developed as a residential building (proposed development). Based on the re-zoning and official plan amendment plans prepared by IBI Group dated June 19, 2020, the proposed development will consist of construction of a 15-storey residential tower (Building C) along with an elevator machine room, which all are resting on top of a one level of underground parking (P1). It is understood that ground floor and P1 lowest finished floor are proposed at El. 113.00 and El. 109.20 masl, respectively. A review of the development plan indicates that 4 levels of above ground parking are also proposed at level 1 (at ground surface) extending to level 4 of the proposed building. A summary of the proposed redevelopment is presented in **Table II**.

Table II: Proposed Redevelopment

Proposed Redevelopment Conditions					
Redevelopment Phase	Above Grade Levels	Below Grade Levels			
		Level #	Lowest Finished Floor		Approximate Base of Proposed Foundation (masl)
			Depth (mbgs)*	Elevation (masl)**	
Building C	15 floors and an elevator machine room	P1	3.8	109.2	108.7

*mbgs- meters below ground surface

**masl- meters above sea level

The subsoil profile and groundwater conditions for the Site are summarized in **Table III and Table IV**:

Table III: Summary of Subsoil Profile

Stratum/Formation	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Hydraulic Conductivity (m/s)**
Fill	0.8-2.3	110.0-111.4	1.00×10^{-6} *
Clayey Silt (Glacial Till)	1.5-3.5	108.6-110.4	4.31×10^{-7}**
Inferred Bedrock	2.4-6.4	106.5-110.2	1.49×10^{-7}**

*Indicates hydraulic conductivity was estimated using typical published values from Freeze and Cherry (1979)

**Indicates hydraulic conductivity was estimated using in-situ hydraulic conductivity test

Table IV: Summary of Groundwater Conditions

Groundwater Conditions	
The stabilized shallow groundwater elevation for the dewatering flow rate estimate	110.59 masl (2.51 mbgs)
Zone of Influence	5.7 m (underground parking), 9.3 m (underground service)

Short-term construction dewatering and long-term foundation drainage flow rates are summarized in **Table V and Table VI**. Short-term (construction) dewatering included underground parking excavation for the proposed building, and proposed underground services (sanitary and storm sewers alignments) as follow.

Table V: Summary of Short-Term Dewatering Calculations

Ground Water Quantity: Short-Term (Construction)							
Location	**Shoring Option**	**Ground Water Seepage (Safety Factor - 1.5)**		**2-Year Rainfall Event (25 mm Design Storm Event)**		**Total Discharge Volume (Seepage + Rainfall)**	
		L/day	**L/sec**	**L/day**	**L/sec**	**L/day**	**L/sec**
Proposed Underground Parking	Permeable Shoring	12,000	0.14	147,000	1.70	159,000	1.84
Proposed Underground Services	Permeable Shoring/Open cut	1,172	0.013	3,000	0.035	4,172	0.048
Total	**-**	**13,172**	**0.153**	**150,000**	**1.74**	**163,172**	**1.89**

Long-term (post construction) dewatering flow rates are summarized in **Table VI**.

Table VI: Summary of Long-Term Dewatering Calculations

Ground Water Quantity: Long-Term (Post Construction)							
Location	**Shoring Option**	**Ground Water Seepage (Safety Factor – 1.5)**		**Infiltration (25 mm Design Storm Event)**		**Total Discharge Volume (Seepage + Infiltration)**	
		L/day	**L/sec**	**L/day**	**L/sec**	**L/day**	**L/sec**
Proposed Underground Parking	Permeable Shoring	9,000	0.10	6,000	0.07	**15,000**	**0.17**

Groundwater quality was assessed in comparison with the Region of Peel Sewer Use By-Law limits with the results summarized in **Table VII**.

Table VII: Summary of Groundwater Quality Assessment

	Region of Peel Storm Sewer Limits	**Region of Peel Sanitary and Combined Sewer Limits**
Untreated Groundwater (Sample ID: SU-BH5)	Exceeds	Exceeds
Treatment Required Prior to Discharge	Yes	Yes

Permits potentially required to be obtained for short-term and long-term dewatering are summarized in **Table VIII**.

Table VIII: Summary of Permits Required for Dewatering

MECP Regulation Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short-Term Permit to Take Water (PTTW)	Not Required
Long-Term Permit to Take Water (PTTW)	Not Required
Municipality Requirements, if connected to municipal sewer	
Short-Term Discharge Agreement	Required
Long-Term Discharge Agreement	Required

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1.0 INTRODUCTION

1.1 Site Location and Project Discerption

Terraprobe Inc. was retained by Ranee Management to conduct a Hydrogeologic Assessment at the property located at 2570-2590 Argyle Road, Mississauga, Ontario (the Site). The Site is located on the south side of Dundas Street West, approximately 100 m to the south of the intersection of Dundas Street West and Parkerhill Road in the City of Mississauga, Ontario. The location of the Site is shown on **Figure 1.**

The Site is irregular in shape with a total lot area of approximately 21,534 m^2. The Site is an active apartment complex that currently comprises of two (2) 12-storey residential towers with municipal addresses of 2570 Argyle Road and 2590 Argyle Road, in the City of Mississauga. It includes asphalt-paved parking lots, and landscaped area. Both towers have one (1) level of basement and at-grade parking lots.

A review of the "Preliminary Site Grading Plan" prepared by Crozier Consulting Engineers dated June 23, 2020, south portion of the Site, which is currently occupied by at-grade parking lots, will be developed as a residential building (proposed development). Based on the re-zoning and official plan amendment plans prepared by IBI Group dated June 19, 2020, the proposed development will consist of construction of a 15-storey residential tower (Building C) along with an elevator machine room, which all are resting on top of a one level of underground parking (P1). It is understood that established grade is proposed at El. 113.27 meters above sea level (masl). Ground floor and P1 lowest finished floor are proposed at El. 113.00 and El. 109.20 masl, respectively. A review of the development plan indicates that 4 levels of above ground parking are also proposed at level 1 (at ground surface) extending to level 4 of the proposed building.

Currently, municipal water and sewer services are provided to the Site. It is understood that future residential redevelopment will be municipally serviced.

The study was undertaken to assess hydrogeological conditions of the Site and to provide general information regarding the hydrogeologic impact of the proposed redevelopment on the local groundwater function. The report addresses the following areas:

- Identifying the geological and hydrogeological setting of the Site;
- Confirming groundwater level and groundwater flow direction beneath the Site;
- Assessing groundwater quality in comparison with Region of Peel Sanitary and Storm Sewer By-Law limits;
- Evaluate potential short-term construction dewatering needs for the proposed redevelopment;
- Estimating the long-term foundation drainage rate;

- Identifying potential impacts to the nearby groundwater receptors including water supply wells and natural heritage features with respect to the proposed redevelopment;
- Providing mitigation plan on the potential impacts to the groundwater receptors associated to the proposed redevelopment; and,
- Providing recommendation on any needs for applying for a Permit to Take Water (PTTW), or posting on Environmental Activity and Sector Registry (EASR) with Ministry of the Environment, Conservation and Parks (MECP).

1.2 Scope of Work

The scope of work for the hydrogeological assessment is summarized below:

- Review of available background information: A review of available background geological and hydrogeological information for the site was completed using Ontario Geological Survey (OGS) maps, MECP, Oak Ridges Moraine Groundwater Program (ORMGP), and Ministry of Natural Resources and Forestry (MNRF) databases.
- Review of the City of Mississauga Official Plans and Credit Valley Conservation (CVC) Authority Policy Areas: The City of Mississauga official plans and CVC maps were reviewed to understand the location of the Site and the proposed redevelopment within the policy areas.
- Site Inspection: A visual inspection of the Site and surrounding areas was conducted to determine local topography and drainage, and an assessment of significant features.
- Groundwater Monitoring and Hydraulic Conductivity Testing: Groundwater levels within the installed monitoring wells were monitored over four (4) monitoring events. In-situ hydraulic conductivity testing was completed within the installed monitoring wells to estimate the hydraulic conductivity of the strata within the well screen interval.
- Groundwater Quality Assessment: Groundwater quality was assessed in comparison with the Region of Peel Sanitary and Storm Sewer By-Law limits to assess available options to discharge the potential dewatering effluent during construction (short-term), or following Site redevelopment for any long-term foundation drainage.
- Review of Proposed Site Redevelopment Concept: The proposed site redevelopment plans were reviewed to confirm the proposed invert elevation for developing underground structures.
- Construction and Post Construction Dewatering Flow Rate Estimates: Considering the proposed redevelopment plans, construction dewatering flow rate (short-term dewatering)

and long-term foundation drainage rate were estimated using the stable groundwater table and estimated hydraulic conductivity measured in the Site.

- Mitigation Plans for Dewatering: A mitigation plan was recommended to mitigate potential short-term dewatering impacts to the nearby groundwater receptors (including natural heritage features and water supply wells), and structures, if applicable.
- Potential Dewatering Permits: Considering the estimated short-term construction and long-term post construction dewatering flow rates, recommendations were provided on any need for applying for a PTTW or posting on the EASR with the MECP, if required.

The above scope of work was undertaken in accordance with all of the following: Ontario Water Resources Act, Ontario Regulation 387/04.

2.0 APPLICABLE REGULATIONS AND AGENCIES

The environmental regulations and policies relevant to this hydrogeological study are briefly discussed below.

2.1 Credit Valley Conservation (CVC) Authority Policies and Regulation (O.Reg. 160/06)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system, and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The CVC, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O.Reg.) 160/06, Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposal or Site alteration work to shorelines and watercourses within the regulated areas.

2.2 City of Mississauga Official Plan

The City of Mississauga's Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and addresses social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

City of Mississauga's Official Plans were reviewed for the current study with the results summarized as below:

- Schedule 1b (Urban System – City Structure) - A review of the map, dated November 22, 2019, indicates that the Site is located within an area designated as Neighbourhood/Downtown.
- Schedule 3 (Natural System) - A review of the map, dated November 22, 2019, indicates that the Site is not located within the areas designated as neither Natural Heritage System nor Natural Hazards.
- Schedule 10 (Land Use Designation) - A review of the map, dated November 22, 2019, shows that the site is located within the Residential High Density Area.

2.3 Permit to Take Water (PTTW)

For construction dewatering, water takings of more than 50,000 L/day but less than 400,000 L/day may be registered on the EASR, while water takings of more than 400,000 L/day require a PTTW issued by the MECP. If it is identified that an EASR or PTTW is required for the Site, a hydrogeological report will need to be submitted in support of the application. Construction dewatering estimation was completed as

a part of the scope of work for the current assessment. Applying for PTTW with the MECP is also required if the anticipated long-term foundation drainage flow rate exceeds 50,000 L/day limits of the MECP.

2.4 Clean Water Act

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs.

Based on a regional-scale source water protection mapping (Source Protection Information Atlas) provided by the MECP dated January 10, 2020, the Site is not located within a WHPA, SGRA, and HVA.

3.0 METHODOLOGY

3.1 Borehole Advancement and Monitoring Well Installation

Drilling boreholes and installation of monitoring wells were conducted in conjunction with geotechnical investigation between December 2 and December 4, 2019. The program consisted of the drilling of a total of ten (10) boreholes, denoted as BH1 through BH10, extending to about 2.4 to 6.4 meters below ground surface (mbgs). Four (4) monitoring wells were advanced in the selected geotechnical boreholes beneath the Site. The locations of the boreholes and monitoring wells are shown on **Figure 2**.

Borehole drilling and monitoring well installation were completed by a licensed contractor, Profile Drilling Inc., under the full-time supervision of a geotechnical technician from Terraprobe, who also logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were advanced using a continuous flight power auger machine using solid stem augers. Detailed descriptions of the encountered subsoil and groundwater conditions are presented on the borehole and monitoring well logs, on the enclosed **Appendix A**, inclusive.

The monitoring wells were constructed using 50-mm diameter PVC riser pipes and screens, which were installed in each of the selected geotechnical boreholes (BH2, BH3, BH5, and BH9) in accordance with Ontario Regulation (O. Reg.) 903. All of the monitoring wells were equipped with steel flush-mount protective casings at the ground surface.

The Universal Transverse Mercator (UTM) coordinates (Zone 17T) and ground surface elevations at the monitoring wells locations, as well as the monitoring well construction details, are presented in **Table 3-1**.

The ground surface elevations and coordinates at the monitoring wells locations were surveyed by Terraprobe using a Trimble R10® GNSS System. The Trimble R10® system uses the Global Navigation Satellite System and the Can-Net® reference system to determine target location and elevation. The Trimble R10® system is reported to have an accuracy of up to 10 mm horizontally and up to 30 mm vertically.

Table 3-1- Monitoring Well Installation Details

Monitoring Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Casing Dia. (mm)	Protective Casing Type
		Easting	Northing					
BH2	December 3, 2019	611270.6	4825498.2	113.3	6.4	4.9 – 6.4	50	Flush-mount
BH3	December 3, 2019	611304.7	4825494.7	113.1	4.9	3.4 – 4.9	50	Flush-mount
BH5	December 2, 2019	611329.9	4825483.4	112.6	5.2	3.7 – 5.2	50	Flush-mount
BH9	December 4, 2019	611328.2	4825433.4	111.7	3.7	2.2 – 3.7	50	Flush-mount

Notes:
mbgs metres below ground surface
masl metres above sea level

3.2 Groundwater Monitoring

All four (4) installed monitoring wells were utilized to measure and monitor groundwater levels. Monitoring wells were developed, and the groundwater monitoring program confirmed the stabilized groundwater level beneath the Site. The stabilized groundwater levels were monitored over four (4) monitoring events. The findings are presented in **Section 6.1**.

3.3 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located at the Site and within 500 m radius of the Site boundaries (Study Area). The findings of the MECP well records are presented in the **Section 4.6** of the current report.

3.4 In-Situ Hydraulic Conductivity Test

Two (2) installed monitoring wells for hydrogeological assessment including BH3 and BH5 were utilized to conduct hydraulic conductivity testing. The in-situ test provides estimated hydraulic conductivity (K) for subsoil strata at the depths of the well screens. The monitoring wells were developed in advance of the tests. Well development involves the purging and removal of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths.

The in-situ falling head hydraulic conductivity test involves the placement of a slug of known volume into the monitoring well, below the water table, to displace the groundwater level upward. The rate at which the water level recovers to static conditions (falling head) is tracked using a data logger/pressure transducer, and/or manually, using a water level tape. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth. The findings for the hydraulic conductivity testing are presented in **Section 6.3.1** of the current report.

3.5 Hydraulic Conductivity based on Grain Size Distribution Graphs

The Hazen equation estimation method was also used to estimate the hydraulic conductivity (K) for saturated subsoils at selected depths beneath the water table below the subject site. The method provides alternative hydraulic conductivity (K) estimates which are derived from the grain size diameter, whereby 10% by weight of the soil particles are finer and 90% are coarser (Freeze and Cherry, 1979). The soils chosen for Hazen estimation were selected primarily within/above the well screen depths. Findings are presented in **Section 6.3.2**.

3.6 Groundwater Quality Assessment

One (1) set of groundwater samples was collected from one (1) selected monitoring well (BH5) to characterize its quality for evaluation against the Region of Peel Storm and Sanitary Sewer Use By-Law (53-2010) parameters. This is performed to assess whether any anticipated dewatering effluent can be disposed of into the City of Mississauga sewer system during construction, or following site redevelopment for any long-term foundation drainage. Based on the results, recommendations for any pre-treatment for any dewatering/drainage effluent can be developed, if required.

One (1) selected monitoring well was developed and purged of three (3) well casings volumes of groundwater prior to sample collection. One (1) complete set of groundwater samples was not filtered during collection, prior to placement in the laboratory sample bottles. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 4 ± ºC for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., a laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The results of the analysis are discussed in **Section 6.4** of the current report.

3.7 Review of Regional Data and Available Reports for the Site

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resource and Forestry (MNRF), and CVC were reviewed. Additionally, available previously issued and concurrent geotechnical reports were reviewed at the time of preparation of the current hydrogeological report, with the findings summarized in **Section 4.**

4.0 REGIONAL AND LOCAL SITE SETTING

4.1 Regional Geology

The current understanding of the surface geological setting of the Site is based on scientific work conducted by the OGS (OGS, 2003). Much of the Site is located within an area mapped as Coarse-textured glaciolacustrine deposits (9c) consisting of sand, gravel, minor silt and clay. Based on a review of the surficial geology map, bedrock can be contacted at the south portion of the Site. The proposed development footprint is partially located within the area mapped as bedrock. **Figure 3** illustrates the mapped surficial geology for the Site and the surrounding area.

Oak Ridges Moraine Groundwater Program (ORMGP) produced a cross-sectional geological map to aid in the characterization of the general area. Considering the regional cross-section, it is understood that the overburden unit prevalent in this area consists of Halton Till (equivalent).

Halton Till (Upper Till): The Halton Till is mainly comprised of sandy silt to clayey silt till interbedded with silt, clay, and a number of discontinuous sand and gravel lenses. It was deposited approximately 12,500 years ago. Based on cross-sectional geology, the Halton Till or equivalent is present approximately in ground surface, with an approximate thickness of up to 1.8 m.

Bedrock: The underlying bedrock at the Site is the Georgian Bay Formation, which consists of shale, limestone, dolostone, and siltstone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted in approximate depth of 2.0 mbgs beneath the proposed development area. Inferred bedrock was contacted at depths ranging between 1.5 and 3.5 mbgs over the current subsurface investigation.

4.2 Regional Physiography

The Site is located within a regional physiography of Southern Ontario known as Iroquois Plain. The Iroquois Plain within the vicinity of the Site comprises sand plain. The Iroquois Plain occupies the lowlands around the western part of Lake Ontario, where it covers about a distance of 300 km, from the Niagara River to the Trent River. It has a width varying from about 100 m to over 10 km. When the last glacier (Wisconsin) was receding from Southern Ontario, the area was inundated by a body of water known as Lake Iroquois, which emptied eastward at Rome, New York State (Chapman and Putnam, 1984). **Figure 4** shows the location of the Site within the regional physiography map.

4.3 Regional Topography and Drainage

A review of a “Site Grading Plan” prepared by Crozier Consulting Engineers dated June 23, 2020 indicates that the ground surface elevation approximately ranges between 114 masl and 112 masl. The plan review shows that topography of the Site slopes gently towards south, in general.

Figure 5 shows regional topography of the Site and surrounding area. Considering the topography map ground surface elevation for the Site and the surrounding area slopes south/southeast direction. As such, it is anticipated that generated runoff (if it is not managed) will flow southeast direction.

4.4 Watershed Setting

The Credit Valley Conservation (CVC) watershed map was reviewed on May 11, 2020. The Site is located within the Norval to Port Credit sub watershed, which has an approximate area of 72.83 km^2 (CVC, 2009). It is situated within one of the most-densely populated regions of Canada, the Credit River Watershed contains some of the most diverse landscapes in southern Ontario. The Niagara Escarpment and the Oak Ridges Moraine run through the watershed, further increasing the number and diversity of plants, animals, and communities. The Credit River is almost 90 km long and meanders southeast from its headwaters in Orangeville, Erin and Mono, through nine municipalities, eventually draining into Lake Ontario at Port Credit, Mississauga (CVC website, 2020).

4.5 Local Surface Water and Natural Heritage Features

MNRF database was reviewed on June 3, 2020 for any natural heritage features including, watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. **Figure 6** shows the location of the Site within the surrounding Natural Heritage Features. Mary Fix Creek flows adjacent to the west boundary of the Site and flows inside the Site at the southwest corner.

A body of water, Stormwater Management pond, is located approximately 300 m to the northwest of the Site, and Lake Ontario is located approximately 4.0 km south of the Site.

Wooded areas are scattered around Site, with the closest record mapped approximately 250 m to the northwest of the Site.

Record review indicates that there are no other records wetland, and ANSI within or in close proximity to the Site.

4.6 Flood Plain Regulated Area

A review of the Source Water Protection Information Atlas interactive mapping tool provided by MECP indicates that portions of the Site and the entire proposed development are located within the zone designated as “Event Based Area”. Pre-development Drainage Plan prepared by Crozier Consulting Engineers dated June 23, 2020 indicates the regulatory flood limits for the Mary Fix Creek and the existing regulatory flood elevation is at 111.91 masl. Additionally, 10 m setback is also presented on this plan. The proposed development footprint is located adjacent and outside of the setback.

4.7 Ground Water Resources (MECP Well Records)

MECP well record database was reviewed for records located within a radius of 500 m from the approximate Site boundary (Study Area). The location of the well records is presented on **Figure 7** with the details for each well summarized in **Appendix B.** A total of 37 wells were located within the study area. A summary of data obtained from record review is presented in **Table 4-1.**

A review of the final status of the records indicates that most local wells are registered as test holes. One (1) well is listed as water supply well. Static groundwater level at this well installed in 1955 approximately 400 m to the north of the Site, was recorded at 2.14 mbgs.

The site is situated in a serviced area within the City of Mississauga. Additionally, there are no records for water supply wells within or in close proximity to the Site.

Table 4-1- MECP Well Records Summary

Number of the Well Records	**40**
Well Type	
Drilled Well	31 (77.5%)
Dug Well	0 (0 %)
Unknown	6 (15%)
Other	3 (7.5%)
Depth Ranges	
Up to 6.0 m (up to 20 ft	22 (55%)
Greater than 6.0 m (20 ft)	9 (22.5%)
Unknown	9 (22.5%)
Water Use (Final Status)	
Observation Well	5 (12.5%)
abandoned/Other	2 (5%)
Test Hole	20 (50%)
Monitoring/test hole	9 (22.5%)
Water Supply	1 (2.5%)
Unknown	3 (7.5%)
Reported Static Level	
0 to 3.0 m (0 to 10 ft)	1 (2.5%)
Unknown	39 (97.5%)

4.8 Active Permit to Take Water Application Records Review

MECP website was reviewed for any active PTTW application records within 1.0 km radius of the Site on March 13, 2020. Record review indicates that there are no active PTTW within the Study Area.

5.0 LOCAL GEOLOGY AND SUBSURFACE INVESTIGATION

Terraprobe completed a geotechnical investigation in conjunction with the hydrogeological assessment. The fieldwork consisted of drilling of a total of ten (10) boreholes extending to a maximum depth of 6.4 meters below ground surface (mbgs). Information regarding borehole logs and grain size distribution graphs is presented in **Appendix A**. The approximate locations of boreholes are shown on **Figure 2**. A subsurface profile (hydrogeological cross-section) across the Site is shown on **Figure 8**. A review of the geotechnical investigation report indicates that the stratigraphy beneath the investigated areas of the Site generally consists of the followings:

5.1 Pavement Structure and Earth Fill

Asphaltic concrete was encountered from the surface at all borehole locations. The thickness of the asphaltic concrete ranges from 75 to 90 mm. An aggregate base course with a thickness of 50 mm was encountered in Borehole BH3 underlying the asphaltic concrete.

Underlying the pavement structure, the boreholes encountered a layer of earth fill extending to depths ranging between 0.8 and 2.3 mbgs (El. 110.0 to 111.4 ±masl). The earth fill is variable in composition across the Site, but is predominantly clayey silt, trace sand, and trace gravel. Silty sand, trace clay trace gravel was encountered in BH6. Shale fragments, organics, asphaltic concrete and brick debris are also encountered at various borehole locations. A strong hydrocarbon odour was noted in Borehole BH1 at a depth of 1.5 m below surface grade. The earth fill ranges in colour from dark grey to brown, and is generally moist. Due to the variation and inconsistent placement of the earth fill materials, the relative density of the earth fill varies from loose to compact. The moisture contents of the earth fill samples range from 9 to 27% by mass, indicating a moist to wet condition.

5.2 Clayey Silt Till

Underlying the earth fill, the boreholes encountered a cohesive deposit of clayey silt till. The clayey silt was encountered at depths ranging from 0.8 to 2.3 mbgs (El. 110.0 to 111.4 ±masl), and extends to depths ranging from 1.5 to 3.5 mbgs (El. 108.6 to 110.4 ±m).

Glacial till is typically a heterogeneous mixture of all grain sizes. At this Site the till is composed predominantly of grey or greyish brown clayey silt, sandy or some sand, and trace gravel.

SPT N-Values recorded in the clayey silt till range from 7 to over 50 blows per 300 mm of penetration, indicative of a firm to hard consistency. The moisture contents of the clayey silt till deposit samples range from 8 to 19% by mass, indicating a moist condition.

5.3 Inferred Bedrock

Split spoon refusal was encountered at all borehole locations underlying the clayey silt glacial till. Based on drilling observations and the grey shale fragments within the split spoons, the refusal is likely encountered on inferred bedrock of the Georgian Bay Formation.

6.0 LOCAL HYDROGEOLOGICAL STUDY

6.1 Monitoring well development and Ground Water Level Monitoring

A groundwater monitoring program was completed between December 10, 2019 and January 9, 2020 as a part of the hydrogeological assessment. Four (4) monitoring wells installed for the hydrogeological assessment (BH2, BH3, BH5, and BH9) were considered for groundwater monitoring program.

Groundwater levels were monitored over four (4) monitoring events. The measured groundwater levels, along with other monitoring wells details and findings, are presented in **Appendix C**. A summary of the groundwater observations is provided in **Table 6-1**:

Table 6-1- Summary of Groundwater Monitoring

Monitoring Well ID	Unit	Ground El. (masl)	Screen Interval	Groundwater Level				Average	Fluctuation
				Dec. 10, 2019	Dec. 17, 2019	Dec. 23, 2019	Jan. 09, 2020		
BH2	masl	113.3	108.4 – 106.9	108.72	108.52	108.58	108.42	108.56	0.30
	mbgs	-	4.9 – 6.4	4.58	4.78	4.72	4.88	4.74	
BH3	masl	113.1	109.7 – 108.2	110.50	110.46	110.59	110.31	110.47	0.28
	mbgs	-	3.4 – 4.9	2.60	2.64	2.51	2.79	2.64	
BH5	masl	112.6	108.9 – 107.4	110.15	109.87	110.09	109.82	109.98	0.33
	mbgs	-	3.7 – 5.2	2.45	2.73	2.51	2.78	2.62	
BH9	masl	111.7	109.5 – 108.0	109.96	109.38	NA	108.96	109.43	1.00
	mbgs	-	2.2 – 3.7	1.74	2.32	NA	2.74	2.27	

Notes:
mbgs metres below ground surface
masl metres above sea level
NA not available

As shown in **Table 6-1**, average groundwater levels ranged from 108.56 masl (4.74 mbgs) to 110.47 masl (2.64 mbgs). The highest and lowest shallow groundwater levels were measured at El. 110.59 masl (2.51 mbgs) and 108.42 masl (4.88 mbgs) at BH3 and BH2, respectively.

In addition, the highest groundwater fluctuation of 1.00 m was measured at monitoring well BH9. The lowest fluctuation of 0.28 m was recorded at monitoring well BH3 location over the monitoring period.

6.2 Shallow Groundwater Flow Pattern

Groundwater level elevations measured on January 9, 2020 were considered to interpret the shallow groundwater flow pattern beneath the Site. **Figure 9** presents the interpreted shallow groundwater elevation contours. A review of the plan indicates that the shallow groundwater is interpreted flowing the west/southwesterly direction, in general, towards the Mary Fix Creek.

6.3 Hydraulic Conductivity Testing

6.3.1 In-Situ Hydraulic Conductivity Testing

Monitoring wells BH3 and BH5 underwent single well response tests (SWRTs) to assess the hydraulic conductivity (K) for saturated shallow aquifer subsoils and inferred bedrock at the depths of the well screens. Each monitoring well was equipped with a digital transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix D**, with a summary of the findings provided in **Table 6-2**.

Table 6-2- Summary of Hydraulic Conductivity Testing

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K) (m/sec.)	Test Method
BH3	113.1	4.9	3.4 – 4.9	Clayey silt glacial till	4.31×10^{-7}	Falling Head Test
BH5	112.6	5.2	3.7 – 5.2	Inferred Bedrock	1.49×10^{-7}	Falling Head Test

Notes:
mbgs metres below ground surface
masl metres above sea level

A review of the findings indicates a moderate to low hydraulic conductivity for the subsoil profile and featured bedrock contacted within the screen interval.

6.3.2 Hydraulic Conductivity Test Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d_{10}, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad_{10}^2$$

where;

d_{10}: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d_{10} is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain size analysis. The grain size distribution graphs prepared for the geotechnical investigation were used to estimate the hydraulic conductivity, with

the details presented in **Appendix A**. The results of the Hazen equation are provided in **Table 6-3**, below.

Table 6-3 - Summary of Hydraulic Conductivity Using Hazen Equation

Borehole/ Monitoring Well ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/sec.)
BH3	2.5 (SS4)	110.6	Clayey silt (glacial till)	3.90×10^{-9}
BH7	2.5 (SS4)	109.1	Clayey silt (glacial till)	4.52×10^{-9}
BH10	1.7 (SS3)	111.2	Clayey silt (glacial till)	2.37×10^{-9}

Notes:
mbgs metres below ground surface
masl metres above sea level

The K estimates determined using the Hazen method suggests low hydraulic conductivity for the clayey silt (glacial till) unit.

6.4 Groundwater Quality

One (1) representative groundwater sample was collected for analysis from monitoring well BH5 on December 23, 2019. The sample was submitted for analysis and evaluation against the Region of Peel Sewer Use By-Law (53-2010) limits.

The submitted samples consisted of unfiltered groundwater, with results presented as totals for various parameters analyzed. Upon sampling, all bottles were placed in ice and packed in a cooler at about 4° C for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., which is accredited by CALA. The results of the analysis are provided in **Appendix E**, with a discussion of the findings provided below.

The analytical results for the unfiltered groundwater samples obtained from monitoring well BH5 indicates that the concentrations for all the analyzed parameters exceeded the Region of Peel's sanitary sewer discharge with the exceedance for Total Suspended Solids (TSS); and exceeded storm sewer discharge with the exceedances for TSS and Total Manganese. The exceedances, together with the storm and sanitary sewer use criteria, are presented in **Table 6-4.**

Table 6-4- Groundwater Quality Analysis Results Exceeded

Exceeded Parameter	Groundwater Quality Results (mg/L)	Region of Peel Sanitary Limits (mg/L)	Region of Peel Storm Limits (mg/L)
TSS	**377**	350	15
Total Manganese	**2.93**	5	0.05

The results suggest that any construction dewatering or foundation drainage effluents would not be acceptable for discharge to the City of Mississauga sanitary and storm sewers. However, implementing pre-treatment to lower TSS and total manganese to meet Region of Peel sanitary and storm sewers by-law limits could potentially permit its discharge to the City's sanitary and storm sewers system.

7.0 CONSTRUCTION DEWATERING

7.1 Proposed Redevelopment Plan Review

Based on the re-zoning and official plan amendment plans prepared by IBI Group, dated June 19, 2020, the proposed redevelopment will consist of construction of a 15-storey residential tower along with an elevator machine room, which all are resting on top of a one level of underground parking (P1). It is understood that established grade is proposed at El. 113.27 masl. Ground floor and P1 lowest finished floor are proposed at El. 113.00, El. 109.20 masl, respectively. A review of the development plan indicates that 4 levels of above ground parking are also proposed at level 1 extending to level 4 of the proposed building.

7.2 A review of Geotechnical Investigation Report

A Terraprobe's geotechnical investigation report entitled "*Geotechnical Investigation and Engineering Design Report, 2570-2590 Argyle Road, Mississauga, Ontario*" dated June 10, 2020, was reviewed as below:

- It is necessary that building floor slabs be provided with a capillary moisture barrier and drainage layer. This is made by placing the slab on a minimum 300 mm layer of 19 mm clear stone (OPSS.MUNI 1004) compacted by vibration to a dense state.
- In considering the approach to groundwater control during construction at this site, the shoring for the excavation will consist of permeable soldier pile and lagging walls. The shoring walls should be toed into sound bedrock of the Georgian Bay Formation.
- The site is bounded on all sides by the parking lot servicing the existing residential buildings on the property. No excavation shall extend below the foundations of existing adjacent structures without adequate alternative support being provided. Terraprobe recommends that if the existing footings for the adjacent buildings are not on bedrock and they are within the zone of influence of the shoring system, they may be supported using a continuous interlocking caisson wall shoring or may be underpinned down to bedrock at locations adjacent to the proposed deeper excavation. Where excavations cannot be sloped, they can be supported using a shoring system such as soldier piles and lagging shoring.

7.3 Summary of Hydrogeological Conditions

The results of the investigation completed by Terraprobe indicate the following hydrogeologic features for the Site:

- Underlying the fill, native deposits mainly comprising glacial till (clayey silt till), underlain by inferred bedrock were encountered.

- The shallow groundwater table for design purposes was to be at El. 110.59 ± masl (2.51 mbgs) measured at BH3 on December 23, 2019.

- The hydraulic conductivity of 4.31 x 10^{-7} m/sec and 1.49 x 10^{-7} m/sec were considered for clayey silt till and inferred bedrock, respectively, in which the excavation and construction will be completed. Additionally, a hydraulic conductivity of 1.0 x 10^{-6} m/sec was considered for the fill material.

- Permeable shoring system consisting of soldier piles and lagging walls was considered for dewatering flow rate estimates as per the project geotechnical engineer's advise.

7.4 Short-Term Groundwater Control Requirements (Construction Dewatering)

7.4.1 Proposed Building

Dewatering Flow Rate Estimate

Underground Garage Plan - Level P1, prepared by IBI Group, was reviewed to estimate dimensions of the proposed excavation area. Based on the shape of the proposed P1 level, dewatering calculations were completed considering two (2) approximate rectangular shape excavation areas as below, which is shown in **Figure 10**:

- Proposed dewatering area 1: partial underground parking area at north section (approximately 35.5 m x 45.5 m).

- Proposed dewatering area 2: partial underground parking area at south section (approximately 81 m x 52.5 m).

Short-term dewatering flow rate was estimated reviewing the proposed redevelopment plans, considering subsoil profile, groundwater conditions and estimated hydraulic conductivity for the geological units, in which the excavation and construction of the underground parking will be completed. Considering the estimated conceptual zone of influence for dewatering and recommendations received from geotechnical investigation (Section 7.2), a permeable shoring system (soldier piles and lagging walls) was considered for the current short-term dewatering flow rate estimate. The assumptions considered for the dewatering flow rate calculations are summarized in **Table 7-1**.

Table 7-1- Summary of Proposed Excavation Dimensions

Proposed Redevelopment	Approximate Proposed Width (m)	Approximate Proposed Length (m)	Proposed FFE (masl)	Assumed foundation El. (masl)	Shallow Groundwater Level (masl)	Proposed Shoring
Proposed Dewatering Area 1	35.5	45.5	109.2	108.7	110.59	Permeable Shoring
Proposed Dewatering Area 2	81	52.5	109.2	108.7	110.59	Permeable Shoring

Notes:
mbgs metres below ground surface
masl metres above sea level

As the approximate elevation of foundation level was assumed to be at 108.7± masl, a dewatering target of 107.7± masl was used to maintain a 1 m dry base of excavations for short-term (during construction).

A numerical analysis was conducted utilizing computer software (Slide 7.014, released March 30, 2016, developed by Rocscience Inc.), utilizing the Finite Element Modelling (FEM) method. FEM for groundwater seepage indicates the short-term (construction) dewatering requirements as provided below. The finite element model results and dewatering rate calculations are presented in **Appendix F.**

The estimated construction dewatering rates for the proposed redevelopments are summarized below:

- Proposed Dewatering Area 1: 2,667 L/day, and it could reach to 4,000 L/day of groundwater seepage into the excavation considering a safety factor of 1.5.
- Proposed Dewatering Area 2: 5,334 L/day, and it could reach to 8,000 L/day of groundwater seepage into the excavation considering a safety factor of 1.5.

- The above estimates do not take into account storm water management from rainfall events. The collection system should also account for a typical 2-year design storm event which will generate approximately 40,500 L/day and 106,500 L/day for proposed dewatering Area 1 and Area 2, respectively.

- The dewatering system should be designed to take into account removal of rainfall from the excavation. According to O. Reg. 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm event, which translates to approximately 152,000 L/day and 400,000 L/day for proposed dewatering Area 1 and Area 2, respectively.

- A total volume of 44,500 L/day and 114,500 L/day are anticipated for short-term construction dewatering with proposed dewatering Area 1 and Area 2, respectively. Total anticipated short-term dewatering flow rate is summarized in **Table 7-2**.

Table 7-2- Summary of Short-Term Dewatering Calculations for Proposed Underground Parking

Location	Shoring Option	Ground Water Seepage (Safety Factor - 1.5)		2-Year Rainfall Event (25 mm Design Storm Event)		Total Discharge Volume (Seepage + Rainfall)	
		L/day	L/sec	L/day	L/sec	L/day	L/sec
Proposed Dewatering Area 1	Permeable Shoring	4,000	0.05	40,500	0.47	44,500	0.52
Proposed Dewatering Area 2	Permeable Shoring	8,000	0.09	106,500	1.23	114,500	1.32
Total	**Permeable Shoring**	**12,000**	**0.14**	**147,000**	**1.70**	**159,000**	**1.84**

Zone of Influence

The conceptual Zone of Influence (ZOI) for dewatering, also known as Radius of Influence (R_0), was calculated based on the anticipated maximum drawdown required and the average hydraulic conductivity recorded at the Site using Sichardt's Relationship. The native stratigraphy at the Site generally consists of clayey silt (glacial till). The ZOI was calculated for short-term (construction) for the Site.

Equation: $R_0 = 3000*dH*K^{0.5}$

Where dH is the drawdown (m)
K is the hydraulic conductivity (m/s)

FFE for the proposed underground structure is proposed at El. 109.2 masl. Base of the footing will be developed 0.5 m below the proposed FFE at El. 108.7 masl. To provide safe, dry and stable conditions for excavations, the water table will need to be lowered in advance of/ during excavation for approximately 1.0 m below the proposed base of the proposed footing at El. 107.7 masl. The highest shallow groundwater level is measured at 110.59 masl.

Zone of Influence (also known as Radius of Influence or R_0) Calculations:

$R_0 = 3000 * 2.89\ m * 4.31 \times 10^{-7}\ m/s^{0.5}$

$R_0 = 5.7\pm\ m$

The estimated ZOI could reach 5.7 m from the proposed excavation area.

7.4.2 Proposed Underground Services

The proposed preliminary site grading and servicing plans prepared by Crozier Consulting Engineers dated June 23, 2020 was reviewed for the current assessment. Plan review indicates that finished floor elevation at the ground floor is proposed at El. 113.00 masl. Additionally, plan review indicates that a proposed sanitary sewer alignment, 55.7 m long, will be developed at the east part of the Site, where the invert elevations range from 110.81 to 109.41 masl (west-east direction). Based on the plan, a storm

sewer alignment, 4.0 m long, is also proposed at the west side of the proposed building having invert elevations ranging between 110.39 and 110.31 masl. Additionally, proposed FFE for the proposed P1 level underground parking was confirmed at El. 109.2 masl, via an email received from the project architect.

Proposed buildings will be connected to the existing sanitary and storm manholes. The location and the invert elevations are presented on **Figure 10**, with a summary presented in **Table 7-3**.

Table 7-3- Summary of Dewatering Calculations for Proposed Underground Services

Proposed Alignment	Approximate Width (m)	Approximate Proposed Length (m)	Existing MH El. (masl)	Shallow Groundwater Level (masl)
Proposed Sanitary Sewer Alignment	2	55.7	109.41	110.59
Proposed Storm Sewer Alignment	2	4	110.31	110.59

Dewatering Flow Rate Estimate

Pumping rate calculations for the proposed underground services performed based on the assumption that the proposed sewer alignments will be installed within a trench. The calculations were based on equations provided in Powers et al. (2007) for unconfined aquifer.

The following equation was used to compute the dewatering rates required for the proposed underground services alignment and is based on unconfined aquifer conditions:

$$Q = \frac{\pi K(H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where,

Q = Anticipated pumping rate (m^3/day)

K = Hydraulic conductivity (m/day)

H = Distance from initial static water level to bottom of the saturated aquifer (m)

h = Depth of water in the well while pumping (m)

R_0 = Distance from a point of greatest drawdown to a point where there is no drawdown (radius of influence) (m)

r_s = Distance to the well points from the centre of the trench (m), assumed to be half of the trench width

x = Trench Length (m)

L = Distance from a line source to the trench, equivalent to Ro (m)

Zone of Influence

An estimate of the Zone of Influence (ZOI) for dewatering excavations in unconfined aquifers can be calculated using the following equation (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

where,

R_0	=	Zone of Influence (m), beyond which there is negligible drawdown
H	=	Distance from initial static water level to bottom of saturated aquifer (m)
S_y	=	Specific yield of the aquifer formation (based on Johnson (1967))
t	=	Time, in seconds, required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)
K	=	Hydraulic Conductivity (m/s)

A summary of the dewatering rate calculations and conceptual ZOI are presented in **Table 7-4** below and **Appendix F**.

Table 7-4- Dewatering Flow Rate Summary

Proposed Alignment	H (m)	h (m)	K (m/s)	Drawdown (m)	ZOI (R0) (m)	Pumping Rate (L/day)	Pumping Rate (L/day) (S.F. -1.5)*	25 mm Storm Event (L/day)	Total Anticipated Volume (L/day)
Proposed Storm Sewer Alignment	0.7	0.1	4.3×10^{-7}	0.7	6.2	48	72	200	272
Proposed Sanitary Sewer Alignment	1.7	0.4	4.3×10^{-7}	1.3	9.3	73	1,100	2,800	3,900
								Total Dewatering Flow Rate	**4,172**

*S.F: Safety Factor

A review of the **Table 7-4** indicates that the anticipated dewatering flow rate for developing the proposed underground services alignments could reach to 4,172 L/day considering a safety factor of 1.5, and 25 mm storm event.

7.5 Long-Term Groundwater Control Requirements (Post-Construction)

The approximate elevation of foundation level was estimated to be at 108.7± masl, and a drainage layer at 108.7± masl was used for long-term (post construction).

A numerical analysis was conducted utilizing computer software (Slide 7.014, released March 30, 2016, developed by Rocscience Inc.), utilizing the Finite Element Modelling (FEM) method. FEM for groundwater seepage indicates the long-term (post construction) dewatering requirements as provided below. The finite element model results and dewatering rate calculations are presented in **Appendix F.**

The estimated post construction dewatering rates for the proposed redevelopments are summarized below:

- Proposed Dewatering Area 1: 2,334 L/day, and it could reach to 3,500 L/day of groundwater seepage into the excavation considering a safety factor of 1.5.

- Proposed Dewatering Area 2: 3,667 L/day, and it could reach to 5,500 L/day of groundwater seepage into the excavation considering a safety factor of 1.5.

- Since surficial asphalt degradation could happen in area above and adjacent to the perimeter of the parking garage, stormwater infiltration should be taken into consideration over the post construction. Therefore, a 2-year rainfall event seeping into the surface around a 0.5 m wide perimeter around the proposed underground parking level was considered. This will generate approximately an additional 2,500 L/day and 3,500 L/day of stormwater infiltration for proposed dewatering Area 1 and Area 2, respectively.

- A total volume of 6,000 L/day and 9,000 L/day are anticipated for long-term foundation drainage flow rate within proposed dewatering Area 1 and Area 2, respectively. A total anticipated long-term dewatering flow rate is summarized in **Table 7-5**.

Table 7-5- Summary of Long-Term Dewatering Calculations

Location	Shoring Option	Ground Water Seepage (Safety Factor – 1.5)		Infiltration (25 mm Design Storm Event)		Total Discharge Volume (Seepage + Infiltration)	
		L/day	L/sec	L/day	L/sec	L/day	L/sec
Proposed Dewatering Area 1	Permeable Shoring	3,500	0.04	2,500	0.03	6,000	0.07
Proposed Dewatering Area 2	Permeable Shoring	5,500	0.06	3,500	0.04	9,000	0.10
Total	**Permeable Shoring**	**9,000**	**0.10**	**6,000**	**0.07**	**15,000**	**0.17**

7.6 Permit Requirements

The estimated short-term (construction) dewatering flow rate reaches 159,000 L/day for developing the proposed underground parking and 4,172 L/day for installation of the proposed underground services alignments. The total estimated short-term construction dewatering flow rate exceeds the MECP lower limits of 50,000 L/day but remains below the MECP upper limit of 400,000 L/day. As such, posting EASR with MECP is required.

Additionally, estimated long-term foundation drainage flow rate (15,000 L/day) is below MECP limits of 50,000 L/day. As such, applying for PTTW with MECP is not required for the long-term (post-construction) dewatering.

Obtaining discharge permit from the City of Mississauga is required for both short-term (construction) and long-term (post construction) if the anticipated dewatering effluent is proposed to be discharged to the City of Mississauga sanitary or storm sewer.

7.7 Potential Dewatering Impacts and Mitigation Plan

7.7.1 Ground Settlement

The estimated ZOI could reach to 5.7 m and 9.3 m away from the excavation area for developing the proposed underground parking and installation of proposed underground services, respectively. Existing buildings within the Site are partially located within the conceptual ZOI. Additionally, Argyle Road and existing buildings located at the north side are partially located within the conceptual ZOI for installation of proposed underground sanitary sewer alignment. It is recommended a professional geotechnical engineer is consulted to assess the potential ground settlement.

7.7.2 Surface Water, Wetlands and Areas of Natural Significance

Mary Fix Creek flows adjacent to the west boundary of the Site. A review of pre-development drainage plan, prepared by Crozier Consulting Engineers indicates that the elevation of the creek ranges from 108.48 masl to 109.48 masl along the west limits of the Site, respectively. Considering the interpreted shallow groundwater flow pattern, flowing towards the creek, and base of the creek within the bedrock, any dewatering program may impact flow rate within the creek. It is recommended the creek is monitored in advance of, during and after construction.

A body of water, Stormwater Management pond, is located approximately 300 m to the northwest of the Site, and Lake Ontario is located approximately 4.0 km south of the Site. Wooded areas are scattered around Site, with the closest record mapped approximately 250 m to the northwest of the Site. Record review indicates that no other records for any other natural heritage features including wetland, water bodies, and ANSI are within or in close proximity to the Site. As such, no impacts to natural heritage features are anticipated with respect to the proposed development.

7.7.3 Water Supply Wells and Zone of Influence

The Site is situated in a serviced area within the City of Mississauga. A review of the MECP well records confirmed that most local wells are registered as test holes and one well is listed as water supply well within 500 m of the Site. Considering the estimated ZOI for construction and location of the water supply well, no concerns are anticipated on the water supply well with respect to the proposed development.

7.7.4 Contamination Sources

Based on the Phase One Environmental Site Assessment (ESA) completed for the Site by Try Environmental Services Inc. dated November 22, 2010, the Phase One ESA did not reveal any significant environmental concerns that would restrict the current use or redevelopment of the Site and no further work/investigation would be required or warranted.

8.0 CONCLUSIONS AND RECOMMENDATIONS

- The Site is located within a regional physiography of Southern Ontario known as Iroquois Plain.
- Much of the Site is located within an area mapped as Coarse-textured glaciolacustrine deposits (9c) consisting of sand, gravel, minor silt and clay. Based on a review of the surficial geology map, bedrock can be contacted at the south portion of the Site. The proposed development footprint is partially located within the area mapped as bedrock.
- The Credit Valley Conservation (CVC) watershed map was reviewed on May 11, 2020. The Site is located within the Norval to Port Credit sub watershed, which has an approximate area of 72.83 km^2 (CVC, 2009).
- Mary Fix Creek flows adjacent to the west boundary of the Site and flows inside the Site at the southwest corner. A body of water, Stormwater Management pond, is located approximately 300 m to the northwest of the Site, and Lake Ontario is located approximately 4.0 km south of the Site. Wooded areas are scattered around the Site, with the closest record mapped approximately 250 m to the northwest of the Site. Record review indicates that there are no other records wetland, and ANSI within or in close proximity to the Site.
- The subsoil profile beneath the pavement structure (asphaltic concrete) consisted mainly of earth fill, underlain by clayey silt (glacial till), and followed by inferred bedrock.
- The average groundwater levels ranged from 108.56 masl (4.74 mbgs) to 110.47 masl (2.64 mbgs). The highest and lowest shallow groundwater levels were measured at El. 110.59 masl (2.51 mbgs) and 108.42 masl (4.88 mbgs) at BH3 and BH2, respectively.
- Estimated hydraulic conductivity using single well response test (SWRT) was 4.31×10^{-7} m/s for clayey silt (glacial till), and was 1.49×10^{-7} m/s for inferred bedrock unit.
- Groundwater quality for one (1) sample collected from monitoring well BH5 exceeds the Region of Peel's sanitary sewer use by-law limits with the exceedance for Total Suspended Solid (TSS), and exceeds the Region of Peel's storm sewer use by-law limits with the exceedances for Total Suspended Solid (TSS) and Total Manganese.
- Short-term construction dewatering flow rate for the proposed underground parking considering a safety factor of 1.5 and a 2-year rainfall event (25 mm design storm event) could reach 159,000 L/day.
- Short-term construction dewatering flow rate for the proposed underground services considering a safety factor of 1.5 and a 2-year rainfall event (25 mm design storm event) could reach 4,172 L/day.

- Long-term post construction dewatering flow rate for the proposed underground parking considering a safety factor of 1.5 and an infiltration (25 mm design storm event) could reach 15,000 L/day.
- The estimated ZOI could extend up to 5.7 m and 9.3 m away from the proposed excavated area for developing the proposed underground parking and installation of proposed underground services, respectively.

9.0 CLOSURE

We trust that the above-noted information is suitable for your review. If you have any questions regarding this information, please do not hesitate to contact the undersigned.

Yours truly,

Terraprobe Inc.

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11.0 LIMITATIONS OF LIABILITY

This report was prepared at the request of, and for the exclusive use of Ranee Management and its affiliates ("the Intended User") is intended to provide an assessment of the hydrogeological conditions of the Property located at 1840-1850 Bloor Street, Mississauga, Ontario (the Site). No one other than the Intended User has the right to use and rely on the work without first obtaining the written authorization of Terraprobe Inc. and Ranee Management.

Terraprobe Inc. expressly excludes liability to any party except the Intended User for any use of, and/or reliance upon, the work. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Terraprobe Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

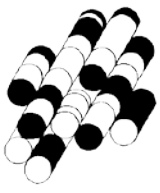
The assessment should not be considered a comprehensive audit that eliminates all risks of encountering hydrogeological problems. The information presented in this report is based on information collected during the completion of the hydrogeological study by Terraprobe Inc. It was based on the conditions on the Site at the time of the hydrogeological study by a review of historical information and field investigation to assess the hydrogeological conditions of the Site, as reported herein.

There is no warranty expressed or implied by this report regarding the hydrogeological conditions for the Site. Professional judgement was exercised in gathering and analyzing information collected by reviewing previous reports, data provided by government and are open to public and field work investigation. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the hydrogeological conditions of the Site is encountered, or in the event that the outstanding responses from the regulatory agencies indicate outstanding issues on file with respect to the Site, Terraprobe Inc. should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

FIGURES

TERRAPROBE INC.

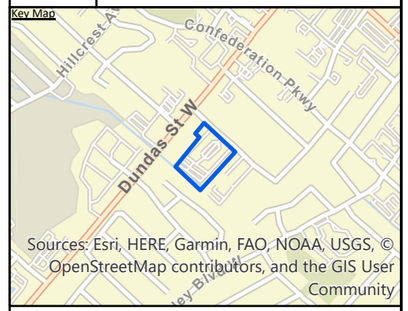


Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing

References:

ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/ Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community.Basemaps

Key Map



Notes:

Legend:

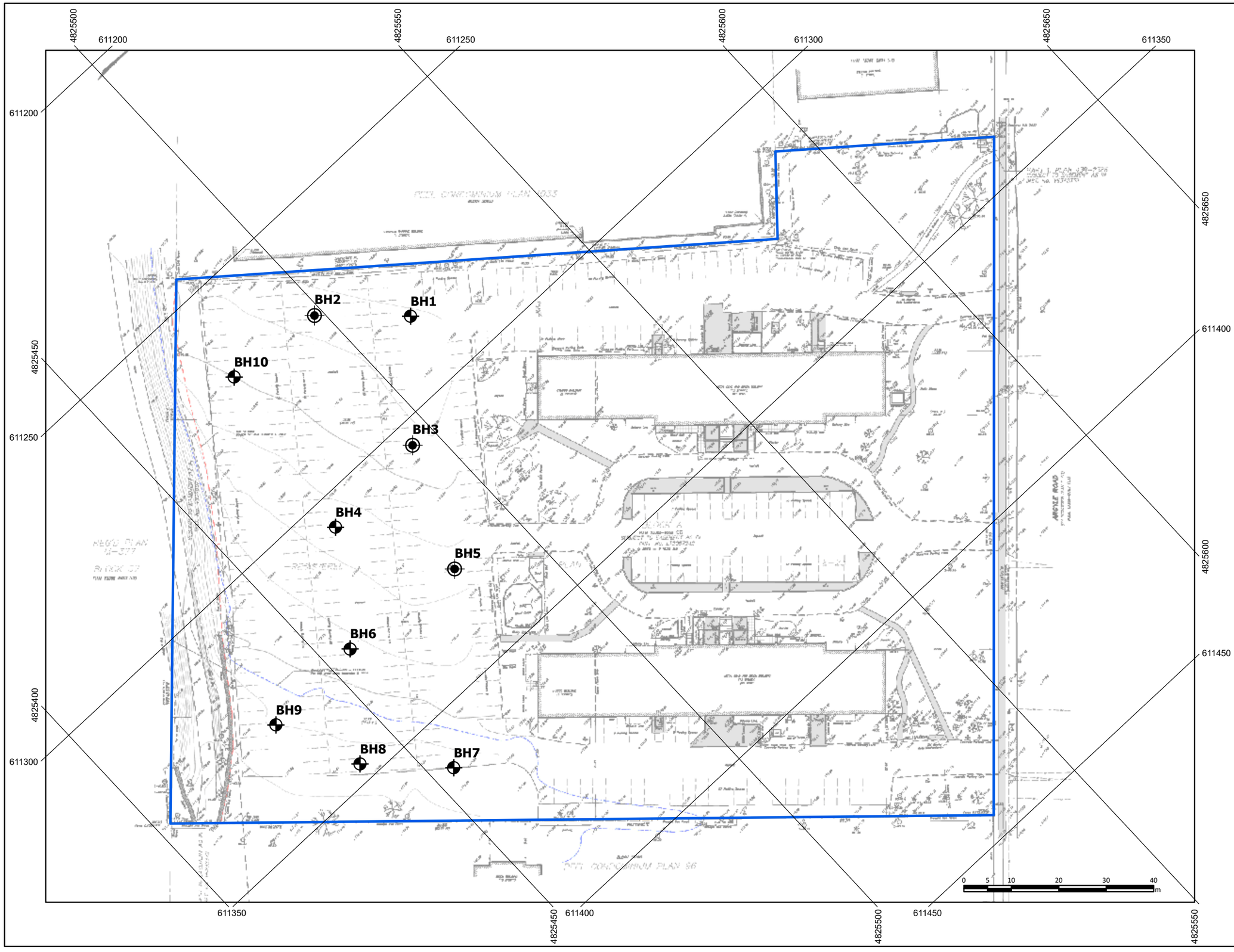
Approximate Site Boundary

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Site Location Plan

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 1
Date: February 2020	



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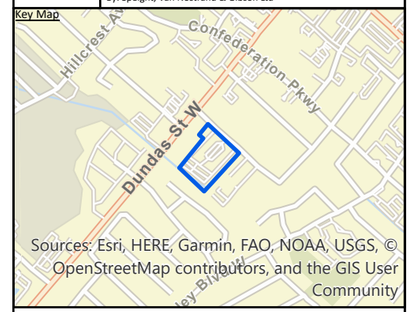
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing

References:

PART OF BLOCK A,
REGISTERED PLAN E-23
CITY OF MISSISSAUGA
Job No: 190-0076
Dated: May 21, 2019
By: Speight, Van Nostrand & Gibson Ltd

Key Map



Notes:

Legend:

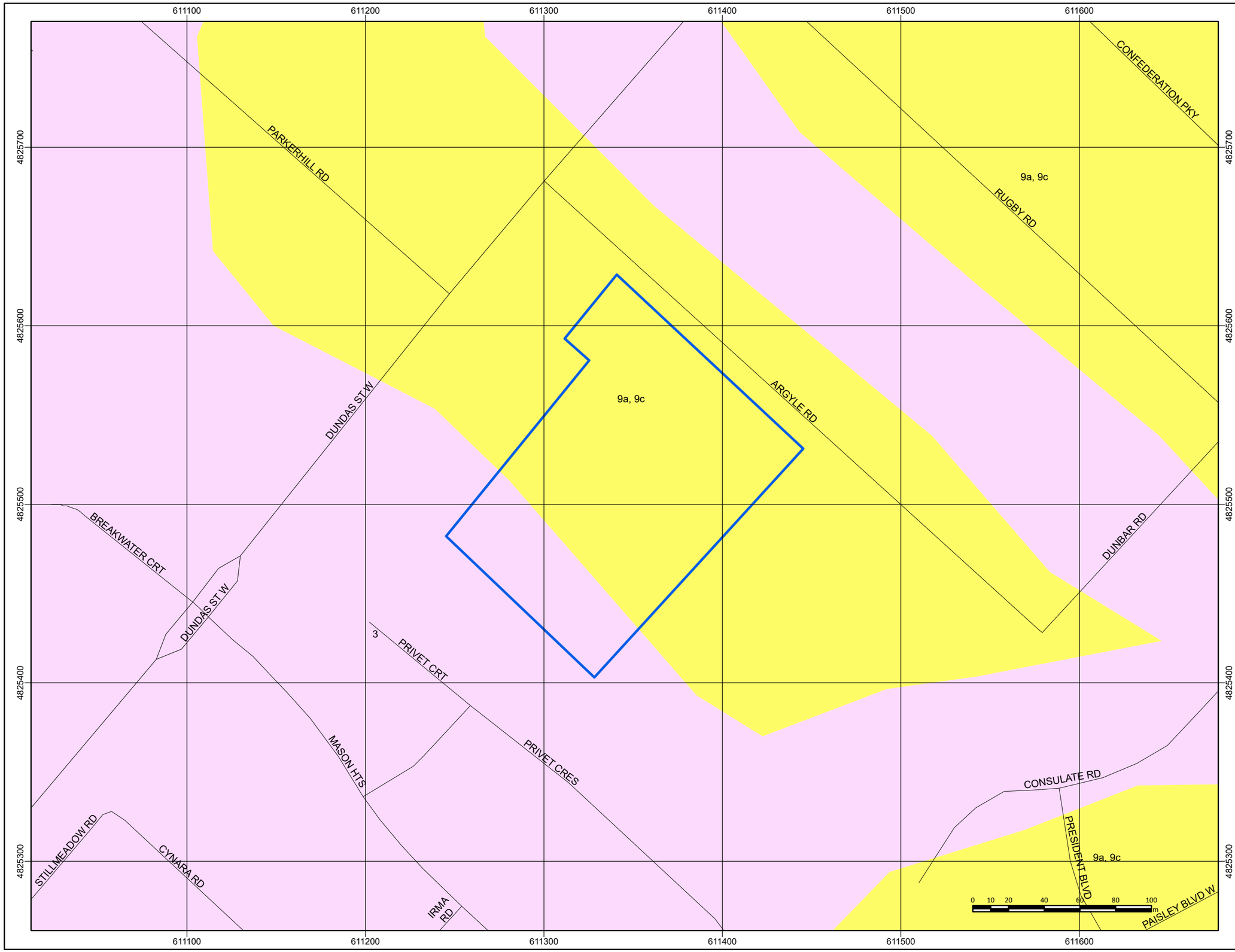
- Approximate Site Boundary
- Approximate Borehole Location
- Approximate Monitoring Well Location

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Borehole and Monitoring Well
Location Plan

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 2
Date: February 2020	



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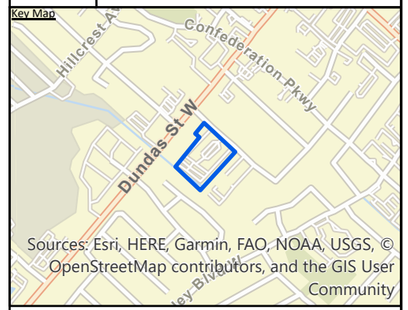
N W E S

References:

Service Layer Credits: © Surface Geology Map was Produced by Terraprobe Inc. under license from the Ministry of North Development, Mines and Forestry (MNDMF). Copyright (c) is hold by the Queen's Printer for Ontario. Surficial geology of southern Ontario, 2003, Ontario Geological Survey, Miscellaneous Release— Data 128 – Revised.

Key Map



Notes:

Legend:

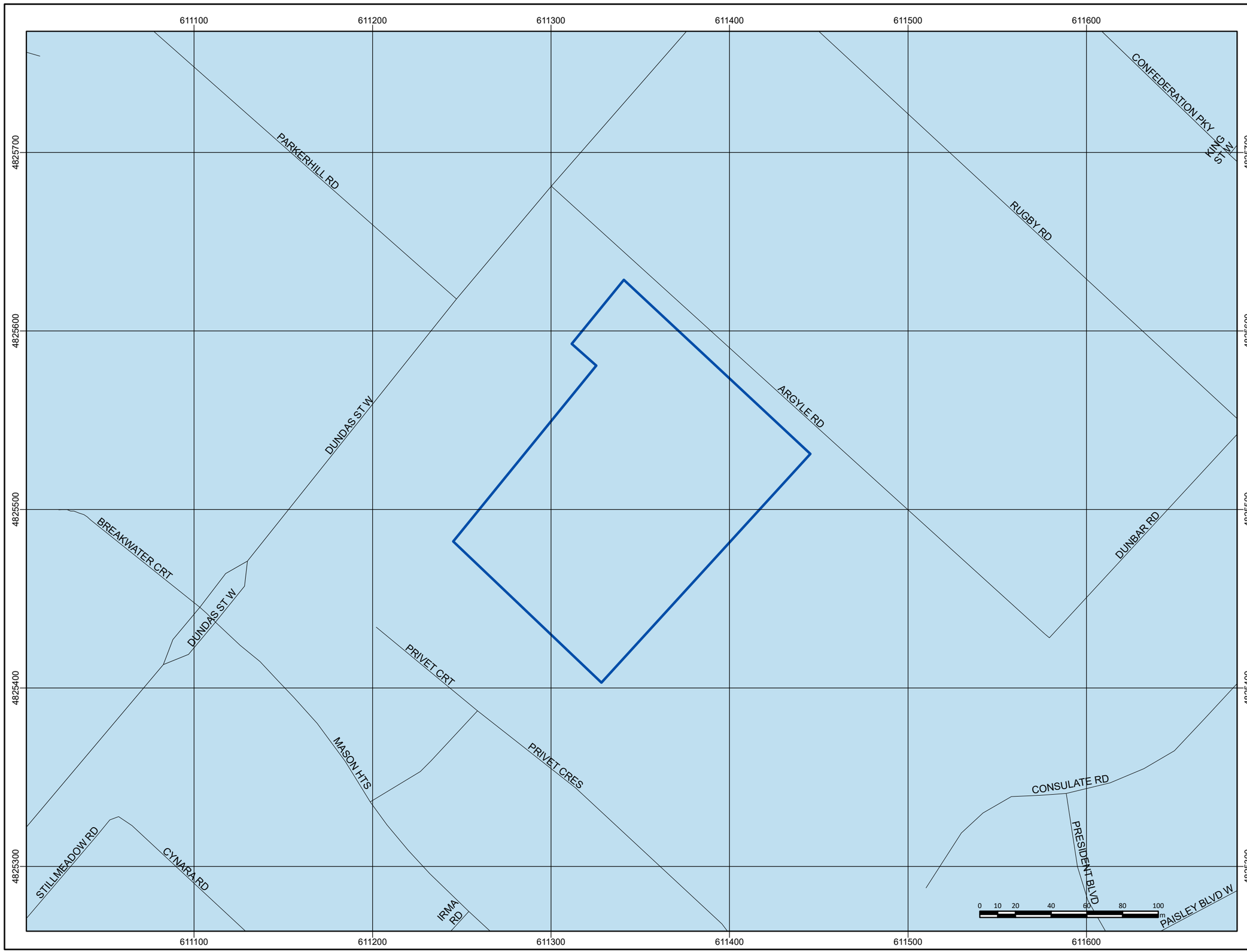
- Approximate Site Boundary
- Collector
- Local / Street
- 3: Paleozoic bedrock
- 9c: Foreshore-basinal deposits

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Surficial Geology Map

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 3
Date: February 2020	



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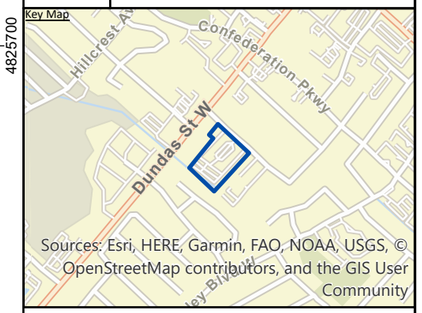
N W E S

References:

Key Map



Notes:

Legend:

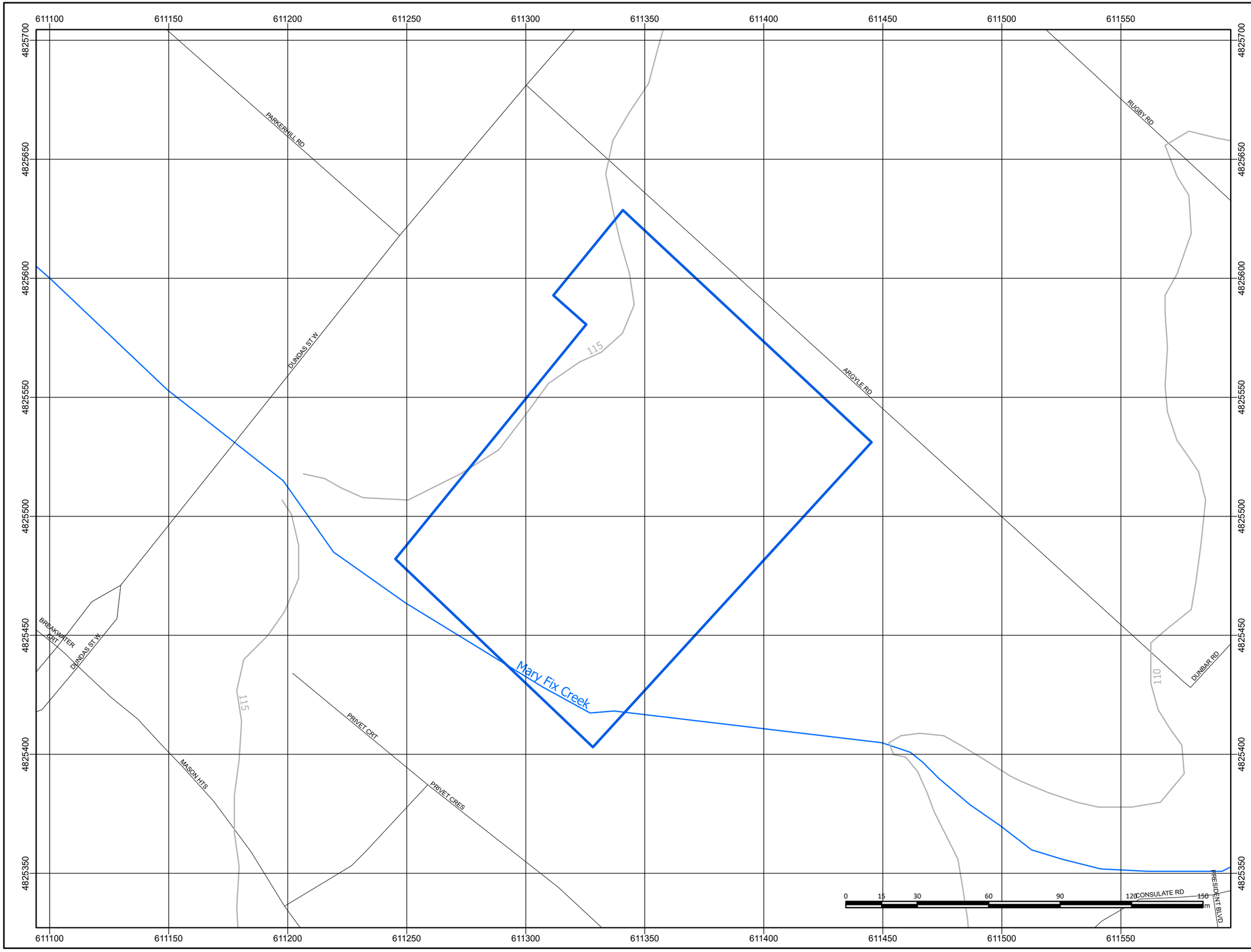
- Approximate Property Location
- Collector
- Local / Street
- 41, Iroquois Plain

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Regional Physiography Map

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 4
Date: February 2020	



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N W E S

References:

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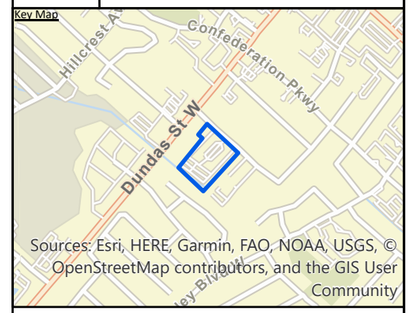
Key Map



Notes:

Legend:

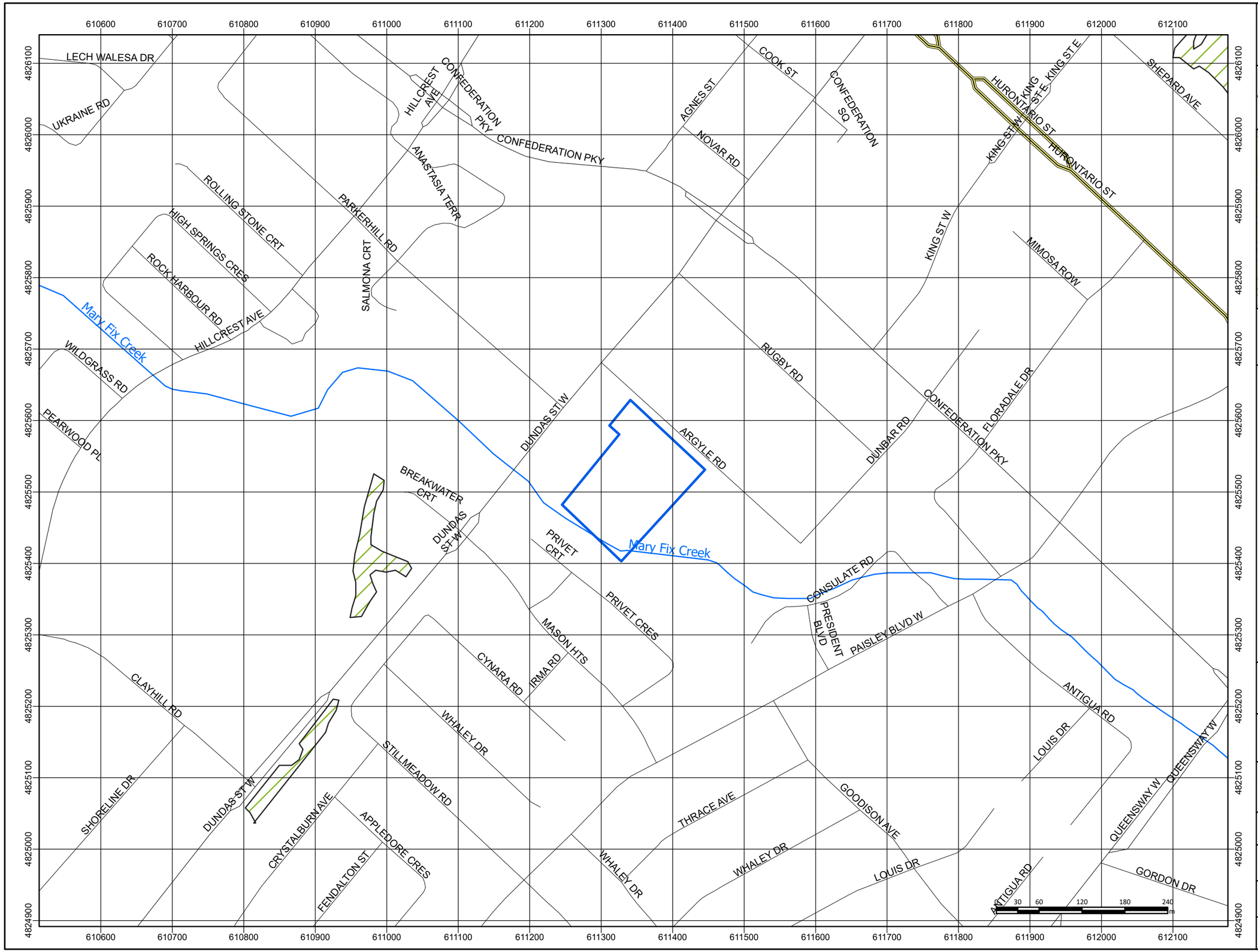
- Approximate Site Boundary
- City of Mississauga Topographic Contours
- Collector
- Local / Street
- Water Course

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Topography Map

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 5
Date: February 2020	



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References:

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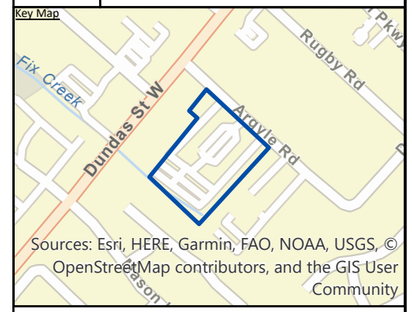
Key Map



Notes:

Legend:

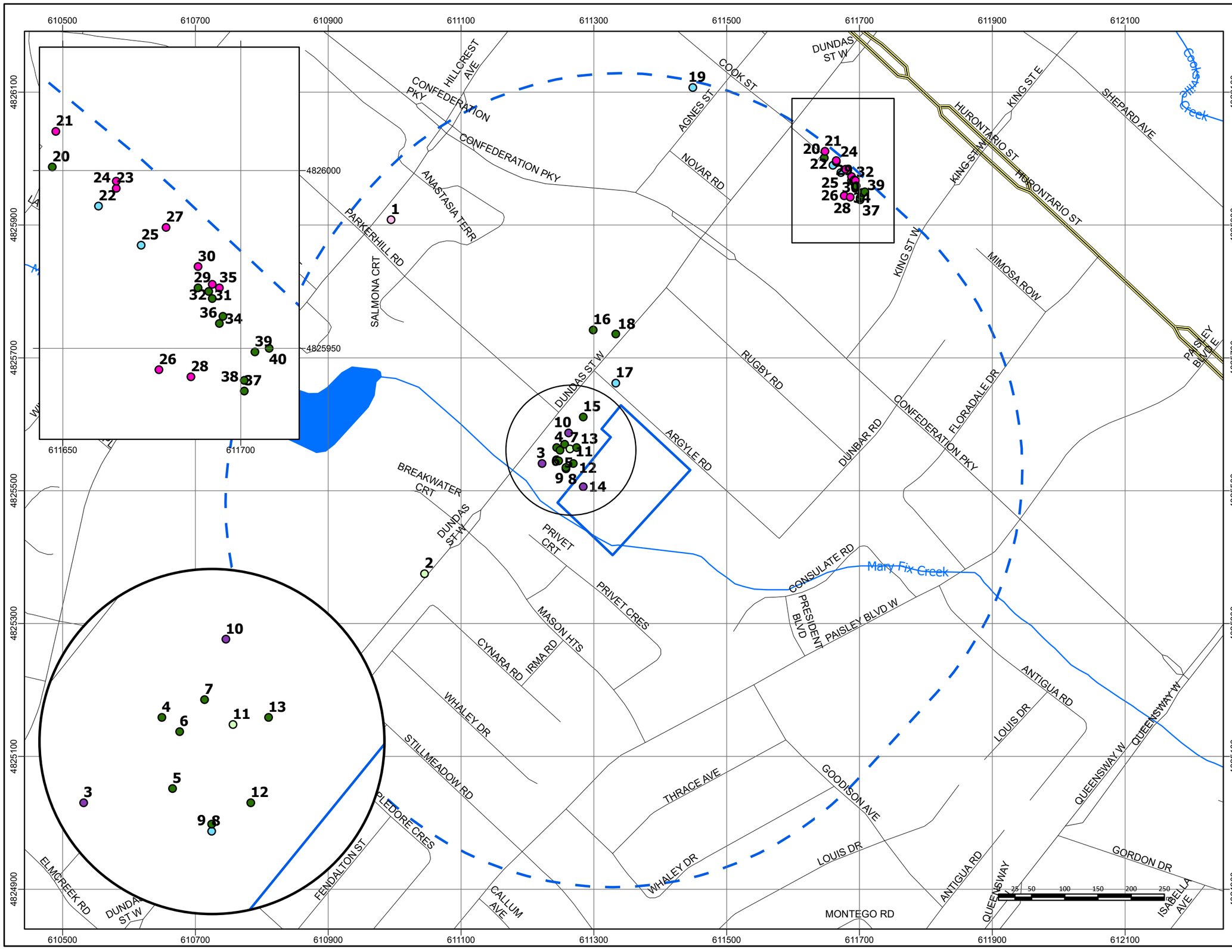
- Approximate Site Boundary
- Collector
- Expressway / Highway
- Local / Street
- Watercourse
- Wooded Area

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Natural Heritage Feature Map

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 6
Date: February 2020	



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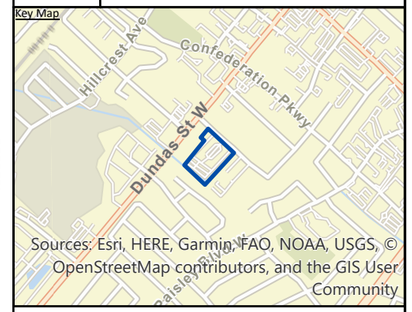
Construction Materials, Inspection & Testing

N W E S

References:

Key Map



Notes:

Legend:

- Approximate Site Boundary
- Approximate Study Area; 500m
- Unknown
- Abandoned-Other
- Monitoring and Test Hole
- Observation Wells
- Test Hole
- Water Supply
- Water Body
- Water Course
- Collector
- Expressway / Highway
- Local / Street

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
MECP Water Well Records Map

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 7
Date: February 2020	

Alignment: From E:611270, N:4825497, to E:611356, N:4825447

Elevation (m)

114 113 112 111 110 109 108 107

BH BH2 — 50 mm dia. monitoring well
'N' 13 11 12 24 39 50 / 50mm

BH BH1
'N' 12 5 11 43 50 / 25mm

BH BH10
'N' 9 6 21 84 / 200mm 50 / 50mm
3 - 27 - 47 - 23

BH BH3 — 50 mm dia. monitoring well
'N' 11 21 8 12 89 / 275mm 50 / 50mm
4 - 13 - 53 - 30

BH BH4
'N' 6 9 29 50 / 125mm 50 / 50mm

BH BH5 — 50 mm dia. monitoring well
'N' 8 12 11 89 / 250mm 50 / 100mm

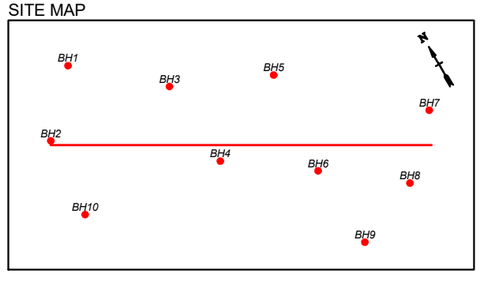
BH BH6
'N' 7 4 63 50 / 125mm

BH BH9 — 50 mm dia. monitoring well
'N' 7 21 50 / 75mm

BH BH8
'N' 6 7 82 50 / 125mm

BH BH7
'N' 21 12 7 78 / 250mm 50 / 75mm
0 - 5 - 63 - 32

SITE MAP



LITHOLOGY GRAPHIC LEGEND

- Asphalt
- Aggregate
- Fill
- Clayey Silt Till
- Bedrock

Boreholes Equally Spaced

INTERPRETIVE LEGEND

- WL on completion of drilling
- Stabilized WL, most recent

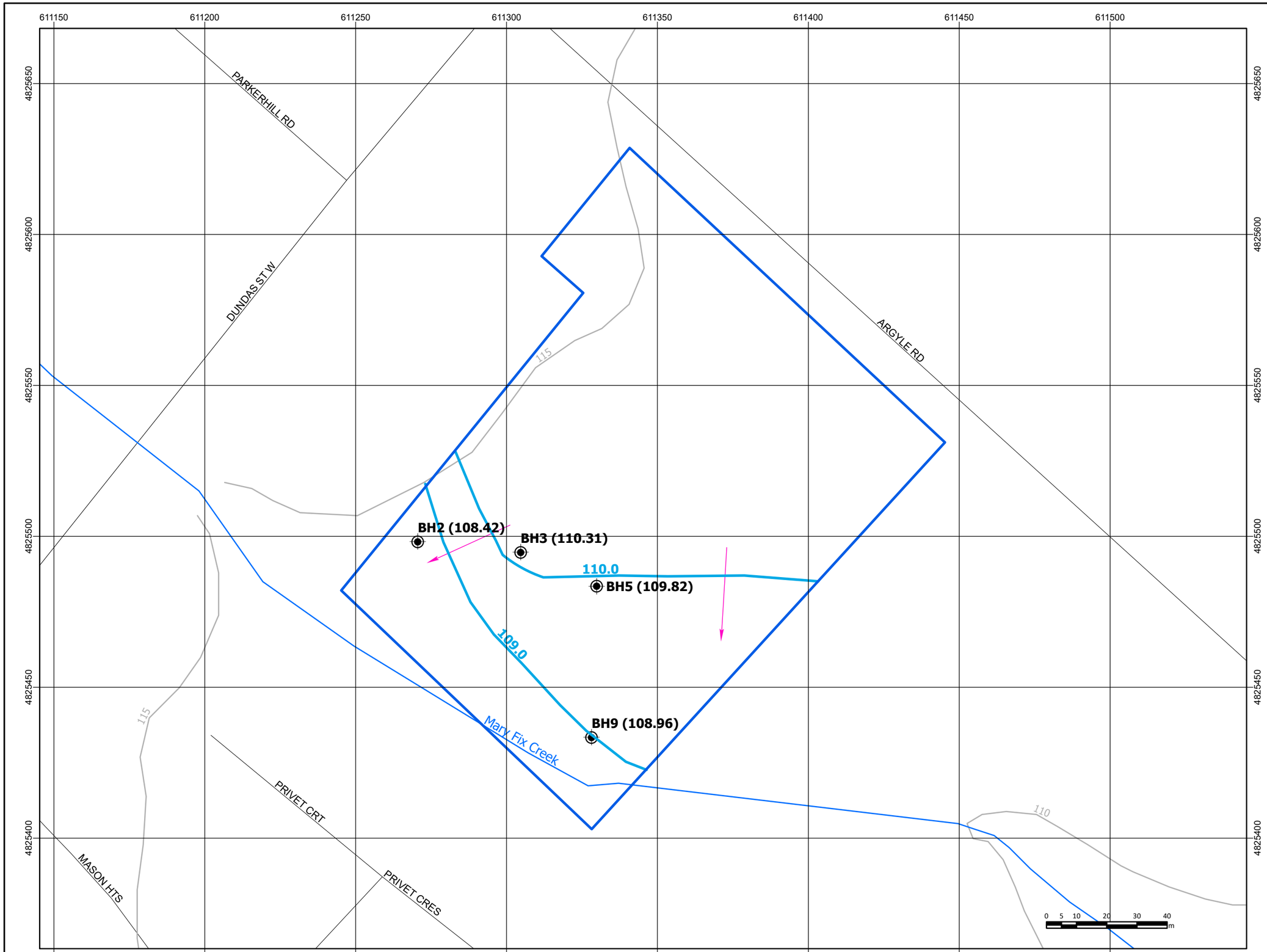
- *FILL*
- *GRAVELS (gravel to gravelly sand)*
- *SILT TO SAND (not till)*
- *COHESIONLESS TILLS*
- *COHESIVE SOILS (clayey silt to clay, incl. tills)*
- *DISTURBED/REWORKED SOILS*

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:
Figure 8
SUBSURFACE PROFILE

File No.:
1-19-0719-46

Report: !SECTION - TABLOID - ELEV



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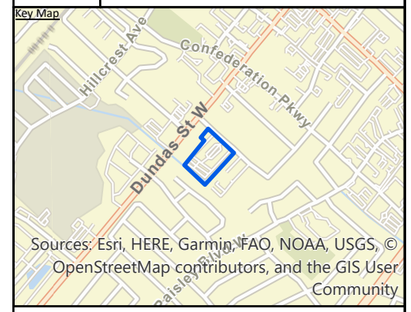
Key Map



Notes:

Legend:

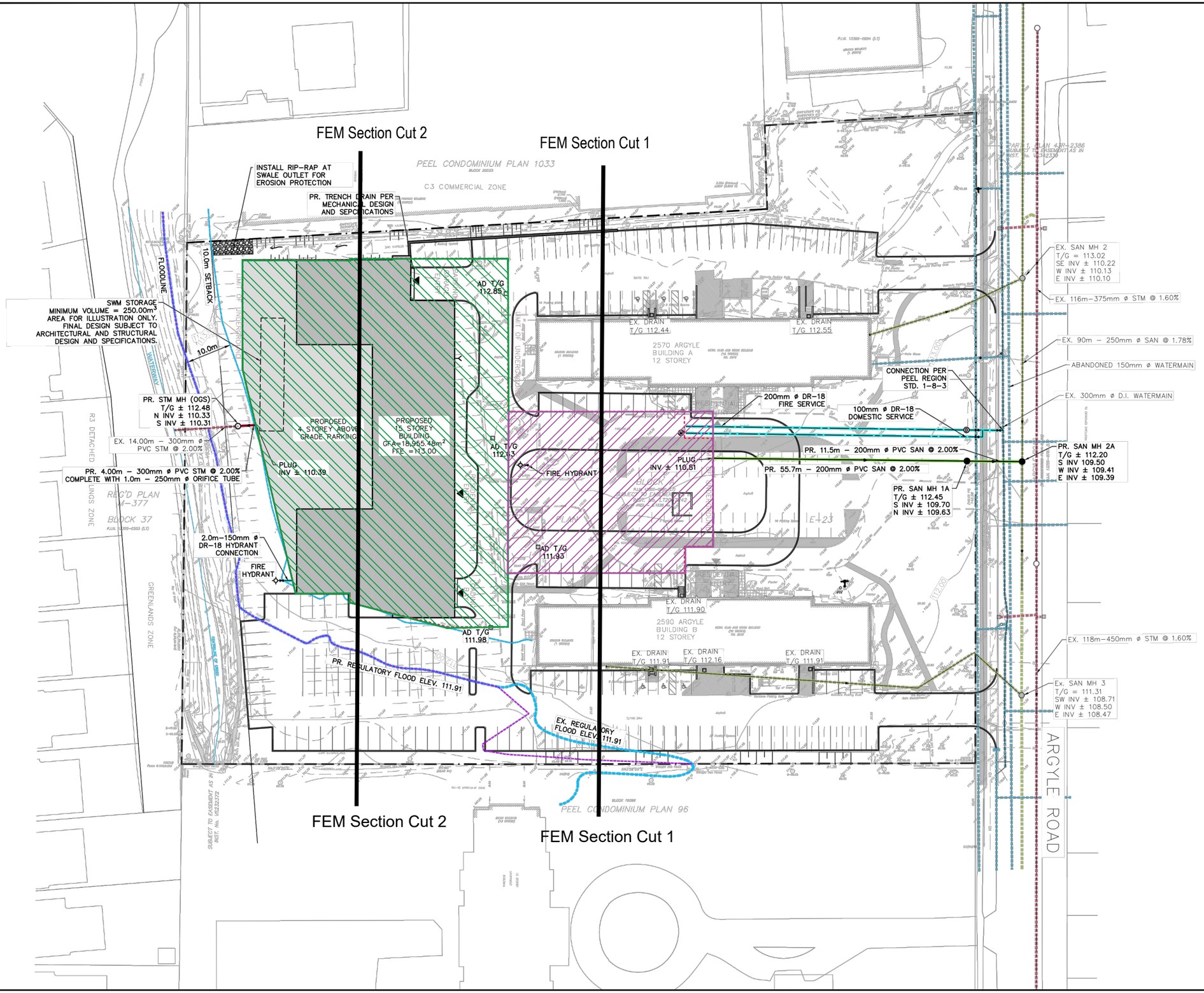
- Approximate Site Boundary
- Approximate Monitoring Well Location
- Watercourse
- Interprated Groundwater Contours
- Interprated Ground Water Flow Direction
- City of Mississauga Topographic Contours
- Collector
- Local / Street
- 110.31 Groundwater Level Measured on Jan. 9, 2020

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road,
Mississauga, Ontario

Figure Title:
Shallow Groundwater Flow Pattern

Designed By: MM	*File No.:* 1-19-0719-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 9
Date: February 2020	



Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing
11 Indell Lane - Brampton Ontario L6T 3Y3 (905) 796-2650

Reference:
Preliminary Site Servicing Plan
2570-2590 Argyle Rd, City of Mississauga, Peel Region
Project No: 1788-5379
Dwg- Fig 1
By: Crozier Consulting Engineers

Notes:

Legend:

- PROPERTY LINE
- FLOODLINE ELEV. 111.91
- 10.0m FLOODLINE SETBACK
- POST–DEVELOPMENT FLOODLINE ELEV. 111.91
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED WATER METER (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED DETECTOR CHECK VALVE IN CHAMBER (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED AREA DRAIN (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED SANITARY SEWER & MANHOLE
- UNDERGROUND PARKING LIMIT
- Proposed Development Area 2 (FEM Section Cut 2)
- Proposed Development Area 1 (FEM Section Cut 1)

Project Title:
Hydrogeological Assessment

Site Location:
2570- 2590 Argyle Road, Mississauga, Ontario

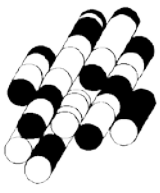
Figure Title:
Proposed Development Plan

Designed By: MM	***File No.:*** 1-19-0719-46
Drawn By: SSK	***Scale:*** As Shown
Reviewed By: BW	***Figure No.:*** 10
Date: February 2020	

C:\Users\singhania\Desktop\1-19-0719\temp.dwg, SSK

APPENDICES

TERRAPROBE INC.

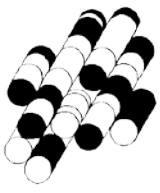


APPENDIX A

Borehole and Monitoring Well Logs

and Grain Size Distribution Graphs

TERRAPROBE INC.



Terraprobe

ABBREVIATIONS AND TERMINOLOGY

SAMPLING METHODS

AS	auger sample
CORE	cored sample
DP	direct push
FV	field vane
GS	grab sample
SS	split spoon
ST	shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).

Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."

COHESIONLESS SOILS

Compactness	'N' value
very loose	< 4
loose	4 – 10
compact	10 – 30
dense	30 – 50
very dense	> 50

COHESIVE SOILS

Consistency	'N' value	Undrained Shear Strength (kPa)
very soft	< 2	< 12
soft	2 – 4	12 – 25
firm	4 – 8	25 – 50
stiff	8 – 15	50 – 100
very stiff	15 – 30	100 – 200
hard	> 30	> 200

COMPOSITION

Term (e.g)	% by weight
trace silt	< 10
some silt	10 – 20
silty	20 – 35
sand *and* silt	> 35

TESTS AND SYMBOLS

MH	mechanical sieve and hydrometer analysis
w, w_c	water content
w_L, LL	liquid limit
w_P, PL	plastic limit
I_P, PI	plasticity index
k	coefficient of permeability
γ	soil unit weight, bulk
G_s	specific gravity
φ'	internal friction angle
c'	effective cohesion
c_u	undrained shear strength

▽	Unstabilized water level
▼	1st water level measurement
▼	2nd water level measurement
▼	Most recent water level measurement
3.0+	Undrained shear strength from field vane (with sensitivity)
C_c	compression index
c_v	coefficient of consolidation
m_v	coefficient of compressibility
e	void ratio
PID	photoionization detector
FID	flame ionization detector

FIELD MOISTURE DESCRIPTIONS

Damp	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
Moist	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at plastic limit) but does not have visible pore water
Wet	refers to a soil sample that has visible pore water

LOG OF BH1

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 3, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611285, N: 4825513 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	113.4	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, trace sand, trace gravel, with shale fragments, stiff, greyish brown, moist		1	SS	12
1		...at 0.8 m, firm		2	SS	5
		...at 1.5 m, strong hydrocarbon odour, stiff		3	SS	11
2	111.1					
	2.3	**CLAYEY SILT**, sandy, trace gravel, hard, brown with orange inclusions, moist (GLACIAL TILL)		4	SS	43
3	110.4					
	110.2	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		5	SS	50 / 25mm
	3.2					

Elevation Scale (m): 113, 112, 111

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 1-19-0719 bh logs.gpj

LOG OF BH2

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 3, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611271, N: 4825498 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	113.3	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, trace sand, trace gravel, trace asphalt pieces, shale fragments, stiff, greyish brown, moist		1	SS	13
1				2	SS	11
				3	SS	12
2	111.0					
	2.3	**CLAYEY SILT**, sandy, trace gravel, very stiff, moist (GLACIAL TILL)		4	SS	24
3		...at 3.0 m, trace sand, hard		5	SS	39
	109.8					
	3.5	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		6	SS	50 / 50mm
4						
5						
6	106.9					
	6.4	**END OF BOREHOLE**				

Elevation Scale (m): 113, 112, 111, 110, 109, 108, 107

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

...at 3.5m, auger grinding

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	4.6	108.7
Dec 17, 2019	4.8	108.5
Dec 23, 2019	4.7	108.5
Jan 9, 2020	4.9	108.4

file: 1-19-0719 bh logs.gpj

LOG OF BH3

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 3, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611305, N: 4825495 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	113.1	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		50mm **AGGREGATE**		1	SS	11
		FILL, clayey silt, trace sand, trace gravel, with shale fragments, firm to very stiff, greyish brown, moist		2	SS	21
1						
				3	SS	8
2	110.8					
	2.3	**CLAYEY SILT**, some sand, trace gravel, stiff, greyish brown, moist (GLACIAL TILL)		4	SS	12
		...at 3.0 m, hard		5	SS	89 / 275mm
3						
4	108.5					
	4.6	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		6	SS	50 / 50mm
	108.2					
	4.9	**END OF BOREHOLE**				

Elevation Scale (m): 113, 112, 111, 110, 109

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
4	13	53	30

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	2.6	110.5
Dec 17, 2019	2.6	110.5
Dec 23, 2019	2.5	110.6
Jan 9, 2020	2.8	110.3

file: 1-19-0719 bh logs.gpj

LOG OF BH4

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 2, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611306, N: 4825471 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	112.5	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, trace sand, trace gravel, with shale fragments, organics, firm to stiff, wet		1	SS	6
1				2	SS	9
	111.0					
	1.5	**CLAYEY SILT**, sandy, trace gravel, very stiff, greyish brown, moist (GLACIAL TILL)		3	SS	29
2	110.2					
	2.3	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		4	SS	50 / 125mm
3	109.4					
	3.1			5	SS	50 / 50mm
		END OF BOREHOLE				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m): 112, 111, 110

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

file: 1-19-0719 bh logs.gpj

LOG OF BH5

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 2, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611330, N: 4825483 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	112.6	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, trace sand, trace gravel, firm to stiff, greyish brown, moist		1	SS	8
1	111.4			2	SS	12
	1.2	**CLAYEY SILT**, sandy, trace gravel, trace shale fragments, stiff, grey, moist (GLACIAL TILL)		3	SS	11
2		...at 2.3 m, some sand, hard		4	SS	89 / 250mm
3	109.6					
	3.0	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		5	SS	50 / 100mm
4						
5						
6	106.5					
	6.1	**END OF BOREHOLE**				

Elevation Scale (m): 112, 111, 110, 109, 108, 107

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	2.5	110.1
Dec 17, 2019	2.7	109.9
Dec 23, 2019	2.5	110.1
Jan 9, 2020	2.8	109.8

file: 1-19-0719 bh logs.gpj

LOG OF BH6

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 2, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611327, N: 4825456 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	112.1	**GROUND SURFACE**				
		75mm **ASPHALTIC CONCRETE**				
		FILL, silty sand, trace clay, trace gravel, asphalt debris, loose, brown, moist		1	SS	7
1		...at 0.8 m, clayey silt, trace sand, trace gravel, soft, grey, moist		2	SS	4
	110.6 / 1.5	**CLAYEY SILT**, sandy, trace gravel, hard, grey, moist (GLACIAL TILL)		3	SS	63
2	109.8 / 109.7 / 2.4	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		4	SS	50 / 125mm

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Elevation Scale (m): 112, 111, 110

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

file: 1-19-0719 bh logs.gpj

LOG OF BH7

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 2, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611360, N: 4825455 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	111.6	**GROUND SURFACE**				
		75mm **ASPHALTIC CONCRETE**				
		FILL, sandy silt, some gravel, trace clay, trace asphalt debris, compact, dark grey, moist		1	SS	21
1		...at 0.8 m, clayey silt, trace sand, trace gravel, stiff		2	SS	12
	110.1					
	1.5	**CLAYEY SILT**, sandy, trace gravel, firm, grey, moist (GLACIAL TILL)		3	SS	7
2		...at 2.3 m, trace sand, hard		4	SS	78 / 250mm
3	108.6					
	108.5	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		5	SS	50 / 75mm
	3.1					

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Elevation Scale (m): 111, 110, 109

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
0	5	63	32

file: 1-19-0719 bh logs.gpj

LOG OF BH8

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 4, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611346, N: 4825441 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	111.5	**GROUND SURFACE**				
		75mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, trace sand, trace gravel, with rootlets, firm, grey, moist		1	SS	6
1				2	SS	7
	110.0 / 1.5	**CLAYEY SILT**, sandy, trace gravel, hard, grey, moist (GLACIAL TILL)		3	SS	82
2	109.2					
	109.1 / 2.4	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		4	SS	50 / 125mm

Elevation Scale (m): 111, 110

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 1-19-0719 bh logs.gpj

LOG OF BH9

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 4, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611328, N: 4825433 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	111.7	**GROUND SURFACE**				
		90mm **ASPHALTIC CONCRETE**				
		FILL, clayey silt, some sand, some gravel, with cinders, organics, firm, dark grey, moist		1	SS	7
	110.9 0.8					
1		**CLAYEY SILT**, sandy, trace gravel, very stiff, grey, moist (GLACIAL TILL)		2	SS	21
	110.2 1.5					
2		**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		3	SS	50 / 75mm
3	108.0 3.7					

Elevation Scale (m): 111, 110, 109

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	1.7	109.9
Dec 17, 2019	2.3	109.4
Dec 23, 2019		n/a
Jan 9, 2020	2.7	108.9

file: 1-19-0719 bh logs.gpj

LOG OF BH10

Terraprobe

Project No. : 1-19-0719-46	Client : Ranee Management	Originated by : DH
Date started : December 3, 2019	Project : 2570 - 2590 Argyle Road	Compiled by : BV
Sheet No. : 1 of 1	Location : Mississauga, Ontario	Checked by : SZ

Position : E: 611269, N: 4825477 (UTM 17T) Elevation Datum : Geodetic

Rig type : B-37 Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments (GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL)
0	112.9	**GROUND SURFACE**					112						
		75mm **ASPHALTIC CONCRETE**											
		FILL, silty sand, trace gravel, trace clay, with brick debris, asphalt concrete, loose, brown, moist		1	SS	9							
1		...at 0.8 m, clayey silt, firm, dark grey, wet		2	SS	6							
	111.4												
	1.5	**CLAYEY SILT**, sandy, trace gravel, very stiff, greyish brown, moist (GLACIAL TILL)		3	SS	21	111						3 27 47 23
2		...at 2.3 m, trace sand, hard, grey, damp		4	SS	84 / 200mm							
3	109.9						110						
	109.8	**INFERRED BEDROCK** (GEORGIAN BAY FORMATION)		5	SS	50 / 50mm							
	3.1	**END OF BOREHOLE**											

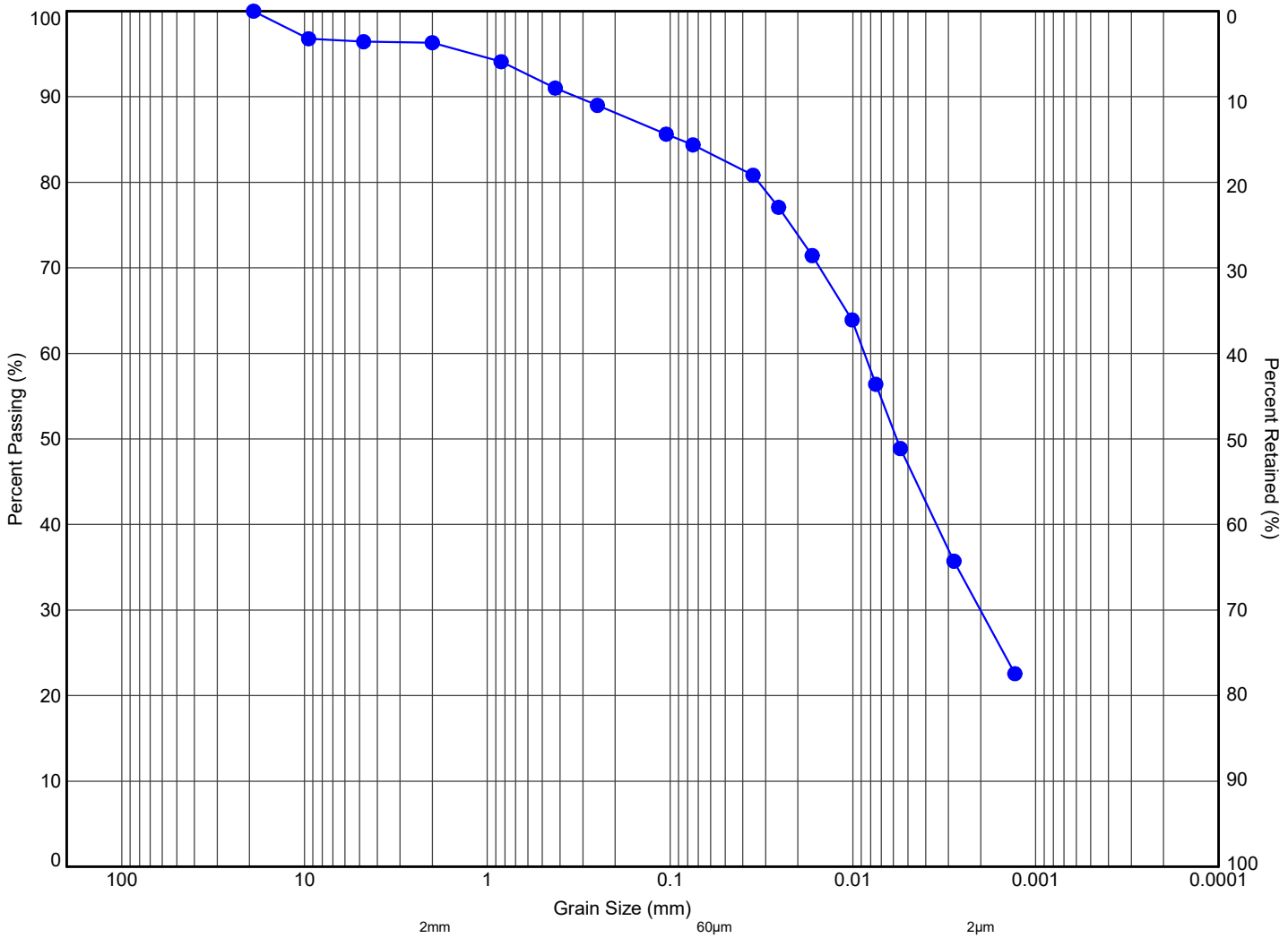
Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL, MC, LL 10 20 30

Borehole was dry and open upon completion of drilling.

file: 1-19-0719 bh logs.gpj



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

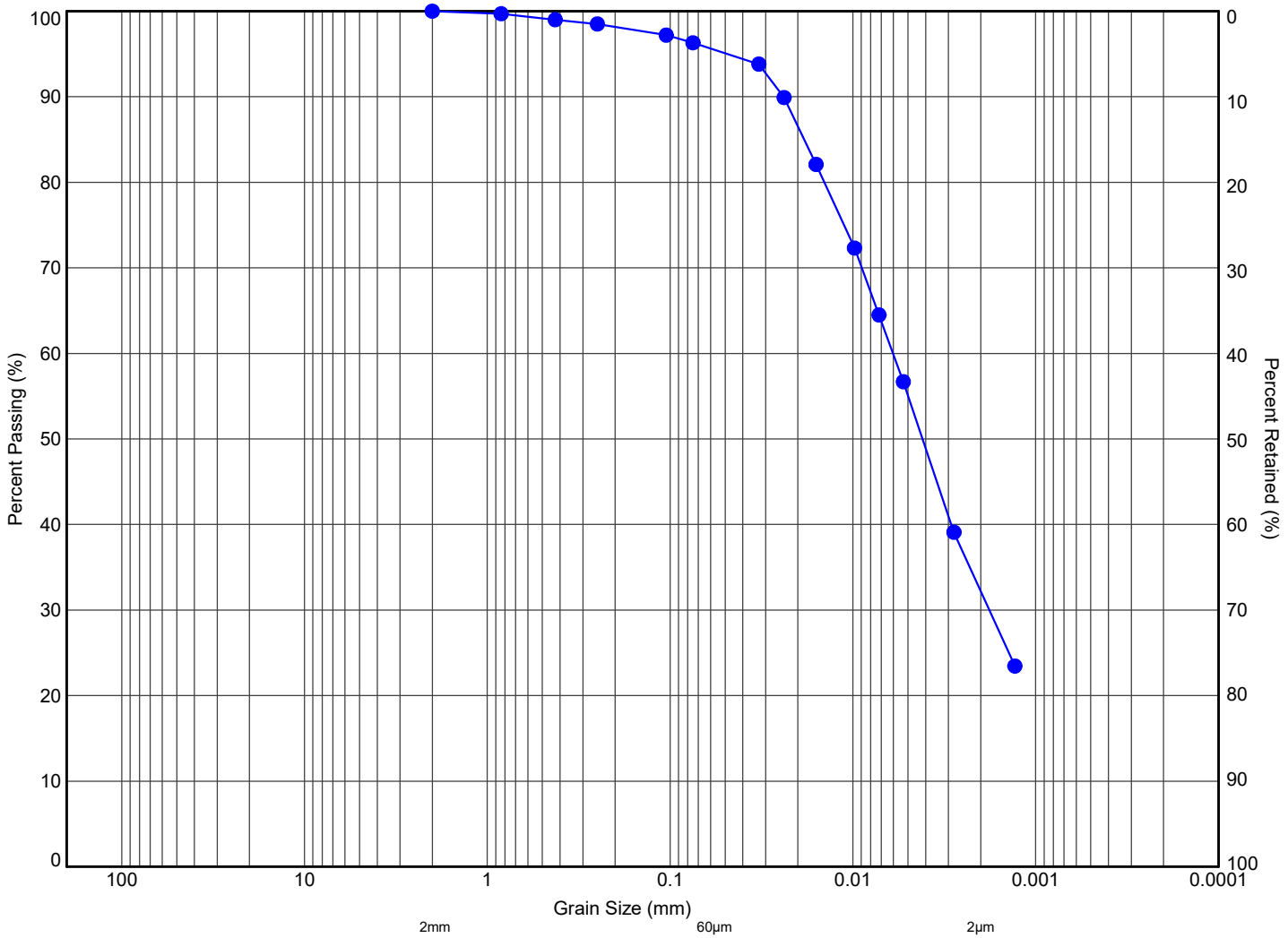
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**BH3**	SS4	2.5	110.6	4	13	53	30	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, SOME SAND, TRACE GRAVEL

File No.: **1-19-0719-01**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

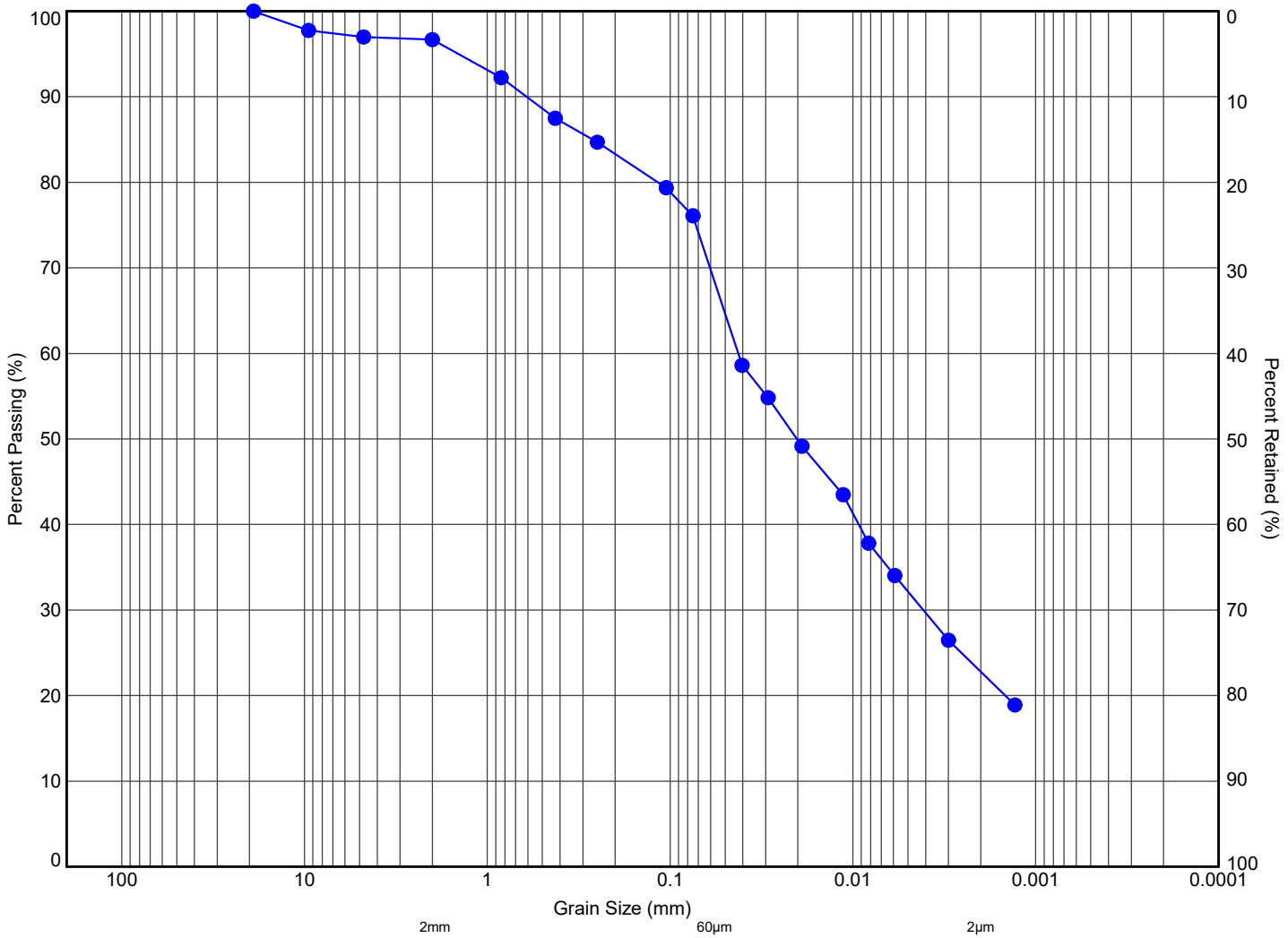
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**BH7**	SS4	2.5	109.1	0	5	63	32	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, TRACE SAND

File No.: **1-19-0719-01**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**BH10**	SS3	1.8	111.2	3	27	47	23	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, SANDY, TRACE GRAVEL

File No.: **1-19-0719-01**

APPENDIX B

MECP Well Records

TERRAPROBE INC.

MECP Well Records Summary

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use					
1	4902212	Cable Tool	-	Water Supply	Domestic	15.56	2.14	-	-	January 10, 1955
2	7044712	-	-	Abandoned-Other	-	-	-	-	-	May 3, 2007
3	7158299	-	-	-	Monitoring	-	-	-	-	December 10, 2010
4	7125539	Air Percussion	4.57	Test Hole	Test Hole	-	-	3.05	4.57	November 25, 2010
5	7125539	Air Percussion	4.57	Test Hole	Test Hole	-	-	3.05	4.57	November 25, 2010
6	7152092	Boring	2.40	Test Hole	Test Hole	-	-	0.90	2.40	February 8, 2010
7	7157739	Air Percussion	4.57	Test Hole	Test Hole	-	-	3.05	4.57	November 25, 2010
8	7113192	Boring		Observation Wells	Monitoring	-	-		-	September 23, 2008
9	7157739	Air Percussion	4.57	Test Hole	Test Hole	-	-	3.05	4.57	November 25, 2010
10	7232882	-	-	-	-	-	-	-	-	November 5, 2014
11	7158298	-	-	Abandoned-Other	Monitoring	-	-	-	-	December 10, 2010
12	7157739	Air Percussion	4.57	Test Hole	Test Hole	-	-	3.05	4.57	November 25, 2010
13	7157739	Air Percussion	-	Test Hole	Test Hole	-	-	-	-	November 25, 2010
14	7261648	Air Percussion	-	-	-	-	-	-	-	October 16, 2014
15	7205206	Other Method	3.60	Test Hole	Monitoring and Test Hole	-	-	0.91	3.60	June 25, 2013
16	7108246	Rotary (Convent.)	3.05	Test Hole	Test Hole	-	-	1.53	3.05	April 24, 2008
17	7236755	Rotary (Convent.)	2.86	Observation Wells	Monitoring	2.39	-	1.34	2.86	September 25, 2014
18	7108266	Rotary (Convent.)	3.10	Test Hole	Test Hole	-	-	1.50	3.10	March 12, 2008
19	7241290	Diamond	9.50	Observation Wells	Monitoring	-	-	6.50	9.50	April 24, 2015
20	7154043	Air Percussion	7.62	Test Hole	Monitoring and Test Hole	-	-	4.57	7.62	September 16, 2010
21	7154121	Other Method	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.57	6.10	September 13, 2010
22	7217458	Direct Push	4.27	Observation Wells	Monitoring and Test Hole	-	-	1.53	4.27	January 23, 2014
23	7147065	Direct Push	5.79	Monitoring and Test Hole	Monitoring and Test Hole	-	-	2.74	5.79	April 28, 2010
24	7154126	Air Percussion	5.49	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.96	5.49	September 14, 2010
25	7217459	Direct Push	1.22	Observation Wells	Monitoring and Test Hole	-	-	1.53	1.22	January 23, 2014
26	7154243	Other Method	3.51	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.98	3.51	September 9, 2010
27	7154123	Air Percussion	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.57	6.10	September 14, 2010
28	7154242	Diamond	3.51	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.53	3.51	September 9, 2010
29	7202013	Direct Push	3.05	Test Hole	Monitoring and Test Hole	-	-	1.53	3.05	March 27, 2013
30	7154122	Air Percussion	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.57	6.10	September 13, 2010

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use					
31	7202014	Direct Push	7.93	Test Hole	Monitoring and Test Hole	-	-	6.41	7.93	March 27, 2013
32	7202011	Direct Push	3.05	Test Hole	Monitoring and Test Hole	-	-	1.53	3.05	March 28, 2013
33	7277826	Rotary (Convent.)	3.97	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.83	3.97	November 16, 2016
34	7154043	Air Percussion	-	Test Hole	Monitoring and Test Hole	-	-	-	-	September 19, 2010
35	7277825	-	3.97	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.83	3.97	November 16, 2016
36	7154043	-	7.01	Test Hole	Monitoring and Test Hole	-	-	3.96	7.01	September 16, 2010
37	7202012	Direct Push	3.05	Test Hole	Monitoring and Test Hole	-	-	1.53	3.05	March 27, 2013
38	7154043	Air Percussion	7.01	Test Hole	Monitoring and Test Hole	-	-	3.96	7.01	September 16, 2010
39	7154043	Air Percussion	7.01	Test Hole	Monitoring and Test Hole	-	-	3.96	7.01	September 16, 2010
40	7202060	Direct Push	3.05	Test Hole	Monitoring and Test Hole	-	-	1.53	3.05	March 28, 2013

*MECP WWID: Ministry of the Environment , Conservation and Parks Water Well Records Identification
**metres below ground surface

APPENDIX C

Groundwater Monitoring Details

TERRAPROBE INC.

2570-2590 Argyle Road, Mississauga, Ontario

Groundwater Depths (m below ground surface)

Monitoring Well ID	Ground Surface Elevation (masl)	Well Depth (mbgs)	Top of the Well Screen Depth (mbgs)	1st GW Monitoring Event	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event
				Water Depth Dec. 10, 2019 (mbgs)	Water Depth Dec. 17, 2019 (mbgs)	Water Depth Dec. 23, 2019 (mbgs)	Water Depth Jan. 9, 2020 (mbgs)
BH2	113.30	6.40	4.90	4.58	4.78	4.72	4.88
BH3	113.10	4.90	3.40	2.60	2.64	2.51	2.79
BH5	112.60	5.20	3.70	2.45	2.73	2.51	2.78
BH9	111.70	3.70	2.20	1.74	2.32	NA	2.74

Groundwater Elevations (m above sea level)

Monitoring Well ID	Ground Surface Elevation (masl)	Well Screen Bottom Elevation (masl)	Top of the Well Screen Depth (masl)	1st GW Monitoring Event	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event
				Ground Water Elevation Dec. 10, 2019 (masl)	Ground Water Elevation Dec. 17, 2019 (masl)	Ground Water Elevation Dec. 23, 2019 (masl)	Ground Water Elevation Jan. 9, 2020 (masl)
BH2	113.30	106.90	108.40	108.72	108.52	108.58	108.42
BH3	113.10	108.20	109.70	110.50	110.46	110.59	110.31
BH5	112.60	107.40	108.90	110.15	109.87	110.09	109.82
BH9	111.70	108.00	109.50	109.96	109.38	NA	108.96

mbgs - meters below ground surface

masl - meters above sea level

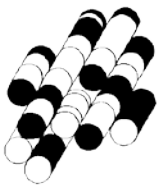
NA - not available

NF - not found (due to snow cover)

APPENDIX D

In-Situ Hydraulic Conductivity Testing Results

TERRAPROBE INC.



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing

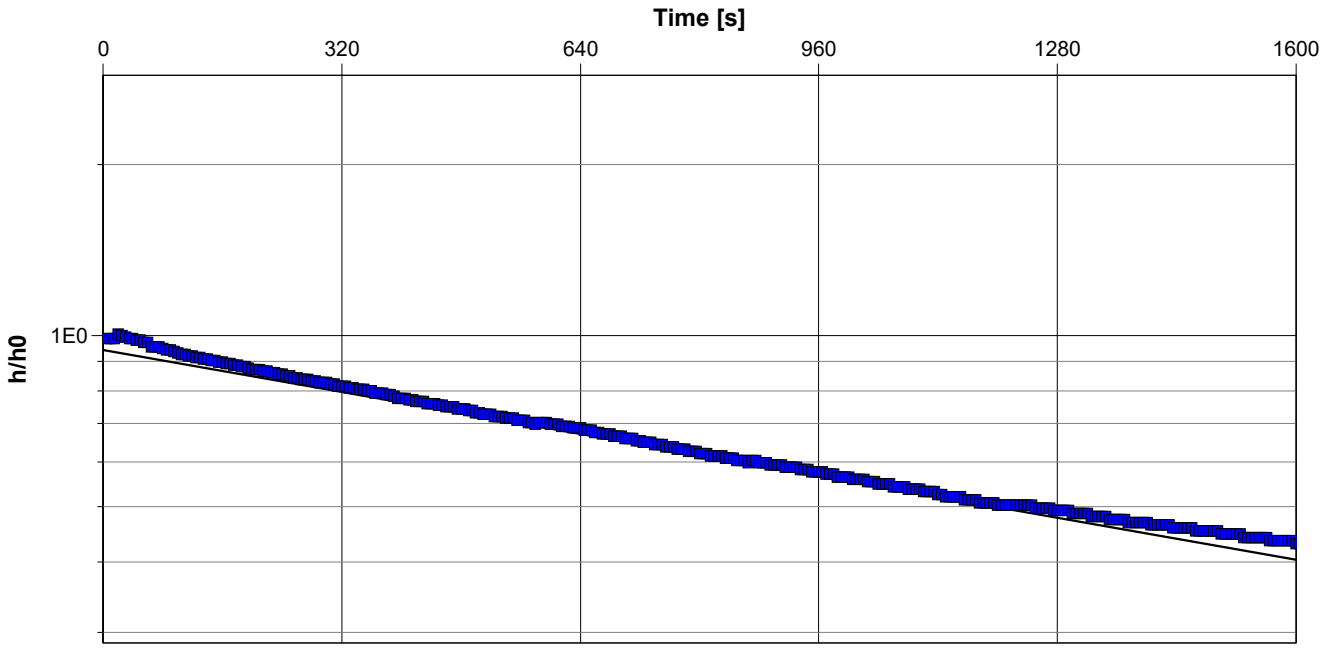
Slug Test Analysis Report

Project: 2570-2590 Argyle Road

Number: 1-19-0719-46

Client: Ranee Management

Location: Mississauga	Slug Test: BH3	Test Well: BH3
Test Conducted by: NK		Test Date: 12/17/2019
Analysis Performed by: TS	BH3	Analysis Date: 5/12/2020
Aquifer Thickness: 4.91 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH3	4.31×10^{-7}

Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing

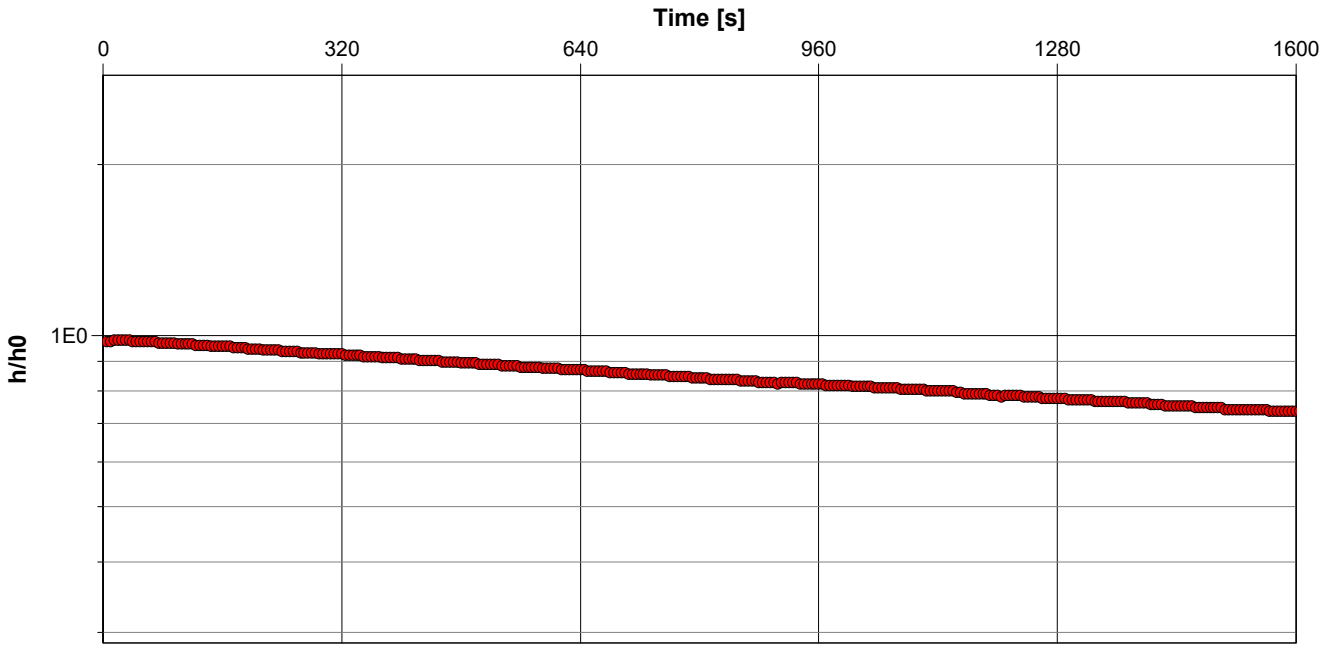
Slug Test Analysis Report

Project: 2570-2590 Argyle Road

Number: 1-19-0719-46

Client: Ranee Management

Location: Mississauga	Slug Test: BH5	Test Well: BH5
Test Conducted by: NK		Test Date: 12/17/2019
Analysis Performed by: TS	BH5	Analysis Date: 5/12/2020
Aquifer Thickness: 5.21 m		



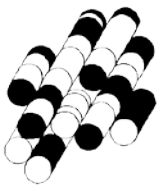
Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH5	1.49×10^{-7}	

APPENDIX E

Groundwater Quality Analysis Results

TERRAPROBE INC.



FINAL REPORT

CA14842-DEC19 R1

1-19-0719-46, 2570-2590 Argyle Road, Mississauga

Prepared for

Terraprobe

FINAL REPORT

CA14842-DEC19 R1

First Page

CLIENT DETAILS

Client	Terraprobe
Address	11 Indell Lane Brampton, Ontario L6T 3Y3. Canada
Contact	Mahmoud Meskar
Telephone	905-796-2650
Facsimile	905-796-2250
Email	mmeskar@terraprobe.ca
Project	1-19-0719-46, 2570-2590 Argyle Road, Mississsauga
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14842-DEC19
Received	12/23/2019
Approved	12/31/2019
Report Number	CA14842-DEC19 R1
Date Reported	01/02/2020

COMMENTS

RL - SGS Reporting Limit
Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 012612

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - General Chemistry** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

	Sample Number	8
	Sample Name	SU-BH5
	Sample Matrix	Ground Water
	Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	5
Total Suspended Solids	mg/L	2	350	15	377
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5

PACKAGE: **SANSEW - Metals and Inorganics** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

	Sample Number	8
	Sample Name	SU-BH5
	Sample Matrix	Ground Water
	Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Fluoride	mg/L	0.06	10		0.21
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Sulphate	mg/L	0.2	1500		210
Aluminum (total)	mg/L	0.001	50		13.7
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0038
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000040
Chromium (total)	mg/L	0.00008	5	0.08	0.0165
Copper (total)	mg/L	0.0002	3	0.05	0.0102
Cobalt (total)	mg/L	0.000004	5		0.00979
Lead (total)	mg/L	0.00001	3	0.12	0.00187

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - Metals and Inorganics**

(WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Manganese (total)	mg/L	0.00001	5	0.05	2.93
Molybdenum (total)	mg/L	0.00004	5		0.00434
Nickel (total)	mg/L	0.0001	3	0.08	0.0168
Phosphorus (total)	mg/L	0.003	10	0.4	0.325
Selenium (total)	mg/L	0.00004	1	0.02	0.00067
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00143
Titanium (total)	mg/L	0.00005	5		0.352
Zinc (total)	mg/L	0.002	3	0.04	0.030

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - Microbiology** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-		200	< 2↑

PACKAGE: **SANSEW - Nonylphenol and Ethoxylates** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02		< 0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2		< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	no unit	0.05	10	9	7.46
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001

PACKAGE: **SANSEW - Phenols** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	0.004

PACKAGE: **SANSEW - SVOCs** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - SVOCs** (WATER)

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002

PACKAGE: **SANSEW - VOCs** (WATER)

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Methyl ethyl ketone	mg/L	0.02	8		< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005

Client: Terraprobe

Project: 1-19-0719-46, 2570-2590 Argyle Road, Mississsauga

Project Manager: Mahmoud Meskar

Samplers: Maden Sural

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SU-BH5
Sample Matrix	Ground Water
Sample Date	23/12/2019

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.27	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010 L1	SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010 L2
SU-BH5					
Total Suspended Solids	SM 2540D	mg/L	377	350	15
Manganese	SM 3030/EPA 200.8	mg/L	2.93		0.05

QC SUMMARY

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO0392-DEC19	mg/L	0.2	<0.2	0	20	97	80	120	89	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0050-DEC19	mg/L	2	< 2	7	30	98	70	130	NV	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0209-DEC19	mg/L	0.01	<0.01	ND	10	93	90	110	84	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0347-DEC19	mg/L	0.06	<0.06	0	10	99	90	110	92	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0025-DEC19	mg/L	0.00001	< 0.00001	ND	20	113	80	120	119	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0171-DEC19	mg/L	0.00005	<0.00005	ND	20	108	90	110	101	70	130
Aluminum (total)	EMS0171-DEC19	mg/L	0.001	<0.001	2	20	107	90	110	93	70	130
Arsenic (total)	EMS0171-DEC19	mg/L	0.0002	<0.0002	7	20	103	90	110	103	70	130
Cadmium (total)	EMS0171-DEC19	mg/L	0.000003	<0.000003	14	20	102	90	110	84	70	130
Cobalt (total)	EMS0171-DEC19	mg/L	0.000004	<0.000004	2	20	103	90	110	101	70	130
Chromium (total)	EMS0171-DEC19	mg/L	0.00008	<0.00008	ND	20	107	90	110	110	70	130
Copper (total)	EMS0171-DEC19	mg/L	0.0002	<0.0002	9	20	103	90	110	92	70	130
Manganese (total)	EMS0171-DEC19	mg/L	0.00001	<0.00001	2	20	102	90	110	NV	70	130
Molybdenum (total)	EMS0171-DEC19	mg/L	0.00004	<0.00004	2	20	101	90	110	108	70	130
Nickel (total)	EMS0171-DEC19	mg/L	0.0001	<0.0001	6	20	99	90	110	102	70	130
Lead (total)	EMS0171-DEC19	mg/L	0.00001	<0.00001	7	20	105	90	110	97	70	130
Phosphorus (total)	EMS0171-DEC19	mg/L	0.003	<0.003	ND	20	95	90	110	NV	70	130
Antimony (total)	EMS0171-DEC19	mg/L	0.0009	<0.0009	ND	20	100	90	110	110	70	130
Selenium (total)	EMS0171-DEC19	mg/L	0.00004	<0.00004	ND	20	110	90	110	100	70	130
Tin (total)	EMS0171-DEC19	mg/L	0.00006	<0.00006	4	20	98	90	110	NV	70	130
Titanium (total)	EMS0171-DEC19	mg/L	0.00005	<0.00005	11	20	96	90	110	NV	70	130
Zinc (total)	EMS0171-DEC19	mg/L	0.002	<0.002	ND	20	98	90	110	79	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9414-DEC19	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0356-DEC19	mg/L	0.01	< 0.01			87	55	120			
Nonylphenol Ethoxylates	GCM0356-DEC19	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0356-DEC19	mg/L	0.01	< 0.01			100	55	120			
Nonylphenol	GCM0356-DEC19	mg/L	0.001	< 0.001			100	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0351-DEC19	mg/L	2	<2	NSS	20	99	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0351-DEC19	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0351-DEC19	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0356-DEC19	no unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0222-DEC19	mg/L	0.002	<0.002	0	10	103	90	110	106	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0349-DEC19	mg/L	0.0001	<0.0001	NSS	30	110	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bis(2-ethylhexyl)phthalate	GCM0350-DEC19	mg/L	0.002	< 0.002	NSS	30	102	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0350-DEC19	mg/L	0.002	< 0.002	NSS	30	101	50	140	NSS	50	140

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0353-DEC19	mg/L	2	< 2	0	10	NV	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0225-DEC19	as N mg/L	0.5	<0.5	ND	10	103	90	110	96	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	100	60	130	95	50	140
1,2-Dichlorobenzene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	99	60	130	96	50	140
1,4-Dichlorobenzene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	99	60	130	96	50	140
Benzene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	95	60	130	99	50	140
Chloroform	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	97	60	130	100	50	140
cis-1,2-Dichloroethene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	96	60	130	99	50	140
Ethylbenzene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	98	60	130	100	50	140
m-p-xylene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	99	60	130	100	50	140
Methyl ethyl ketone	GCM0366-DEC19	mg/L	0.02	<0.02	ND	30	105	50	140	80	50	140
Methylene Chloride	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	93	60	130	97	50	140
o-xylene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	99	60	130	101	50	140
Styrene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	99	60	130	100	50	140
Tetrachloroethylene (perchloroethylene)	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	96	60	130	95	50	140
Toluene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	97	60	130	98	50	140
trans-1,3-Dichloropropene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	96	60	130	92	50	140
Trichloroethylene	GCM0366-DEC19	mg/L	0.0005	<0.0005	ND	30	96	60	130	95	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

SGS Request for Laboratory Services and CHAIN OF CUSTODY

Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 012612
Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Kim Sherd
Received Date: 12/23/19 (mm/dd/yy)
Received Time: 14:50 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☐ No ☑
Custody Seal Intact: Yes ☐ No ☑
Cooling Agent Present: Yes ☑ No ☐ Type: ice
Temperature Upon Receipt (°C) 4.4.4
LAB LIMS #: CA 14842 Dec19

REPORT INFORMATION

Company: Terraprobe. Inc
Contact: Mahmoud Meskar
Address: 11 Indell Ln, Brampton, ON
Phone: 905-796-2650
Fax:
Email: mmeskar@terraprobe.ca

INVOICE INFORMATION

☑ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email: lrossi@terraprobe.ca

Quotation #:
P.O. #:
Project #: 1-19-0719-46
Site Location/ID: 2570-2590 Argyle Rd, Mississauga

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04:
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium
☐ Table 3 ☐ Agri/Other ☐ Fine
☐ Table ____

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: Peel Region

RECORD OF SITE CONDITION (RSC) ☐ YES ☑ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na-water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni, Se,Ag,Ti,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs (all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only (no BTEX	VOC: VOCs (all incl BTEX	VOC: BTEX only	Pest: Pesticides (Organochlorine or specify other	Other: Sewer Use: Region of Peel Specify pkg:	Other: Water Characterization Pkg General ☐ Extended ☐	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	SV-BH5	Dec23/19	11:19	15	GW	N												X			
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Observations/Comments/Special Instructions

Sampled By (NAME): Madan Sunal
Signature: Madan
Date: 12/23/19 (mm/dd/yy)

Relinquished by (NAME): Madan Sunal
Signature: Madan
Date: 12/23/19 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

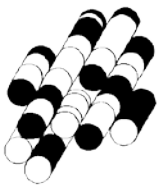
Revision #: 1.2
Date of Issue: 09 Sept, 2019

APPENDIX F

FEM Modelling

and Dewatering Rate Calculations

TERRAPROBE INC.



Short-Term Proposed Dewatering Area 1

Material Name	Color	KS (m/s)
Earth Fill		1e-006
Clayey Silt (Glacial Till)		4.31e-007
Inferred Bedrock		1.49e-007

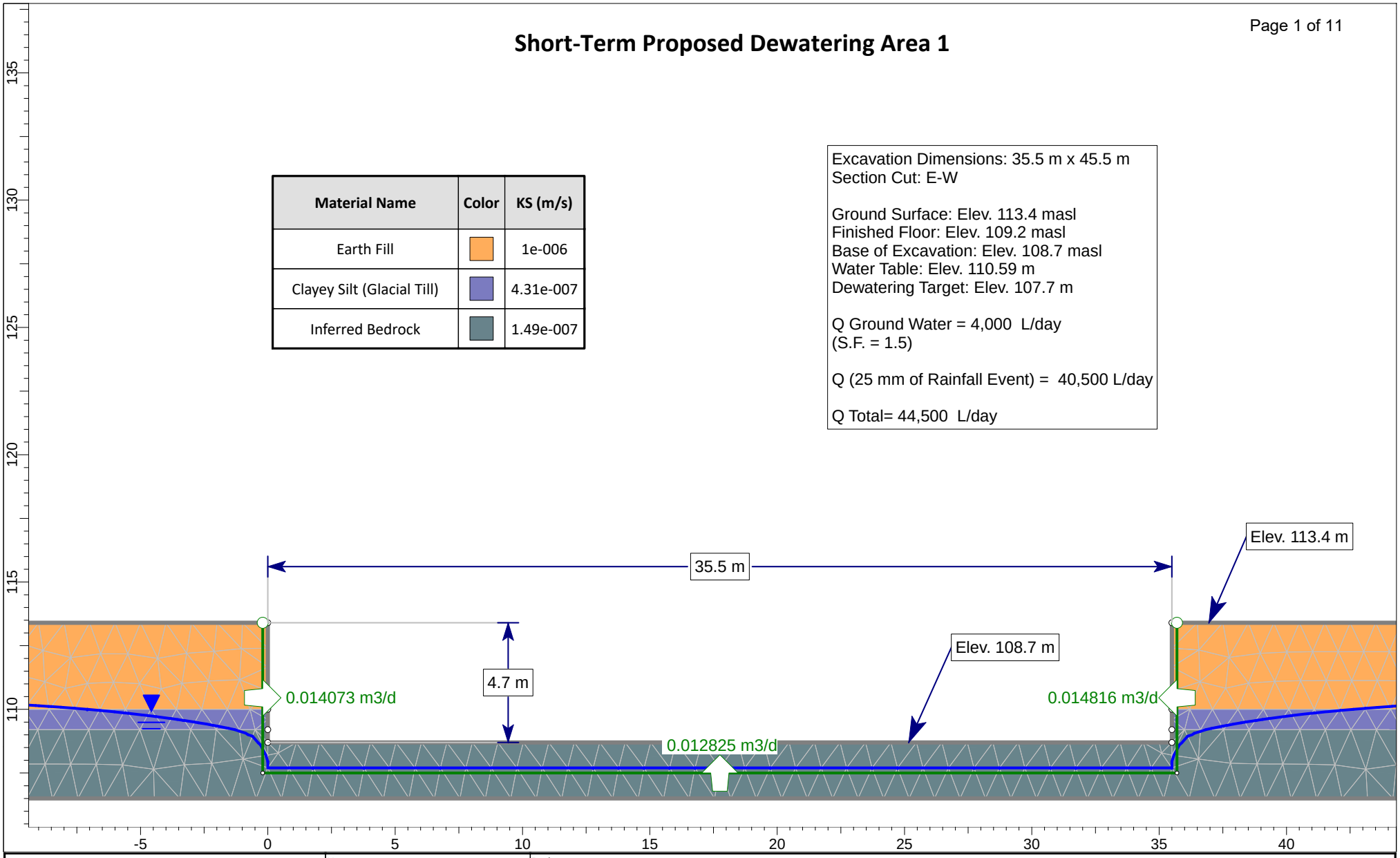
Excavation Dimensions: 35.5 m x 45.5 m
Section Cut: E-W

Ground Surface: Elev. 113.4 masl
Finished Floor: Elev. 109.2 masl
Base of Excavation: Elev. 108.7 masl
Water Table: Elev. 110.59 m
Dewatering Target: Elev. 107.7 m

Q Ground Water = 4,000 L/day
(S.F. = 1.5)

Q (25 mm of Rainfall Event) = 40,500 L/day

Q Total= 44,500 L/day



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

SLIDEINTERPRET 7.031

Notes
Refer to Hydrogeological Report for factual information supporting this analysis.

Project **1-19-0719-46 I 2570 - 2590 Argyle Rd, Mississauga**

Analysis Dewatering, Short Term, Permeable

Date	Scale	File
06/24/2020	1:205	1-19-0719-46, 2020-06-23 - (1).slmd

By U.A

Ref.

Short-Term Proposed Dewatering Area 2

Material Name	Color	KS (m/s)
Earth Fill		1e-006
Clayey Silt (Glacial Till)		4.31e-007
Inferred Bedrock		1.49e-007

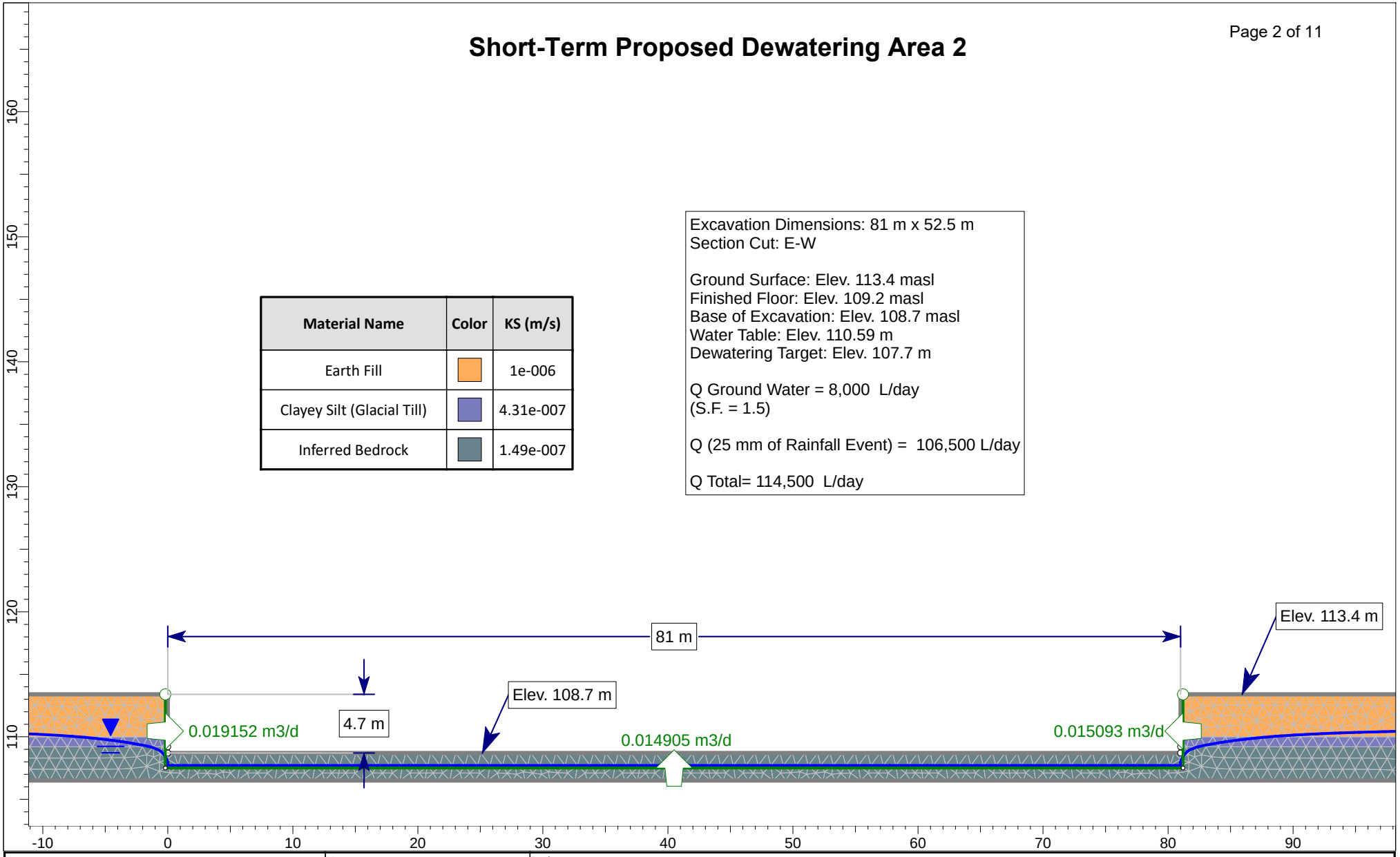
Excavation Dimensions: 81 m x 52.5 m
Section Cut: E-W

Ground Surface: Elev. 113.4 masl
Finished Floor: Elev. 109.2 masl
Base of Excavation: Elev. 108.7 masl
Water Table: Elev. 110.59 m
Dewatering Target: Elev. 107.7 m

Q Ground Water = 8,000 L/day
(S.F. = 1.5)

Q (25 mm of Rainfall Event) = 106,500 L/day

Q Total= 114,500 L/day



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

SLIDEINTERPRET 7.031

Notes
Refer to Hydrogeological Report for factual information supporting this analysis.

Project: **1-19-0719-46 I 2570 - 2590 Argyle Rd, Mississauga**

Analysis: Dewatering, Short Term, Permeable

Date: 06/24/2020 | Scale: 1:418 | File: 1-19-0719-46, 2020-06-23 - (2).slmd

By: U.A | Ref.

Long-Term Proposed Dewatering Area 1

Material Name	Color	KS (m/s)
Earth Fill		1e-006
Clayey Silt (Glacial Till)		4.31e-007
Inferred Bedrock		1.49e-007

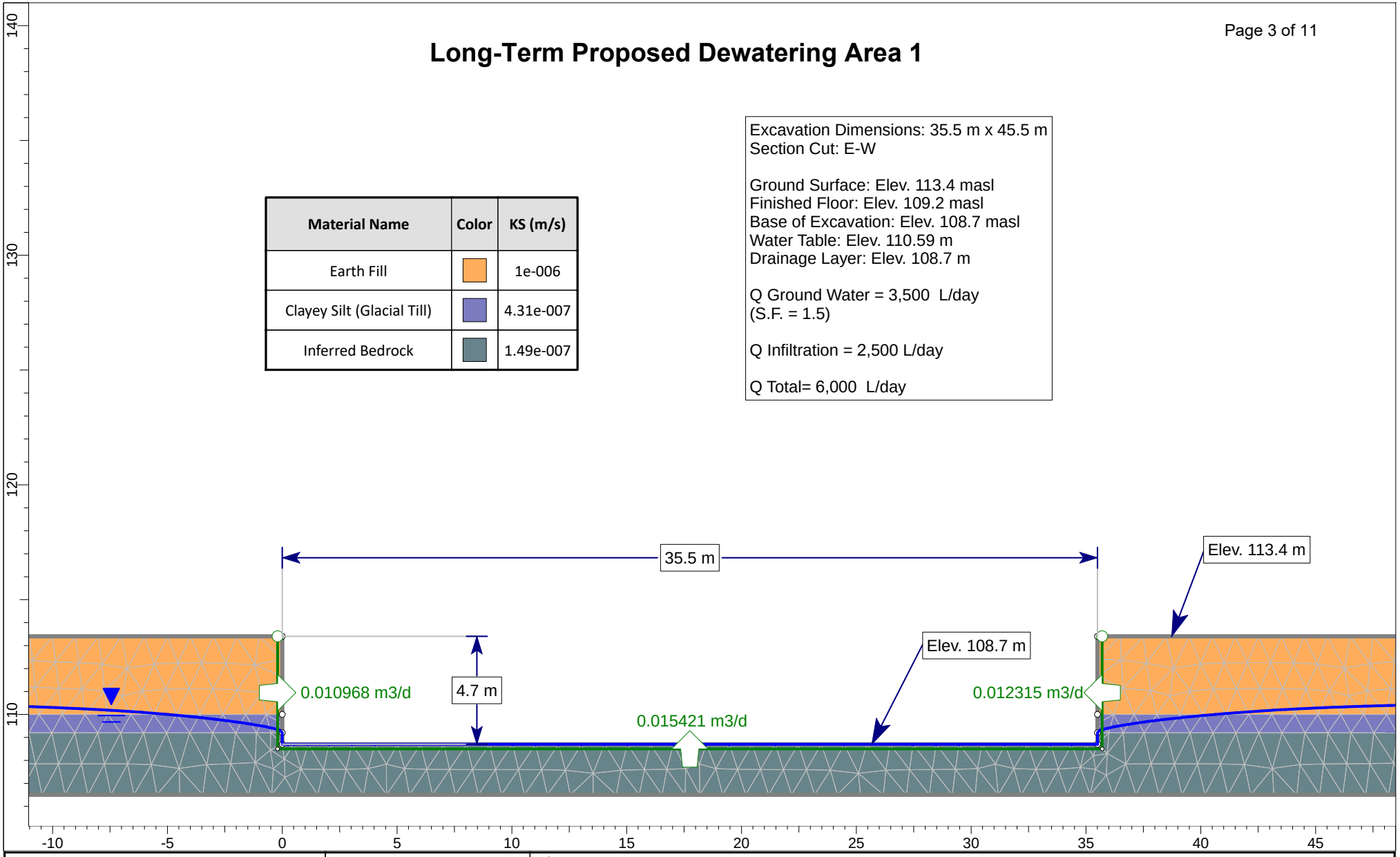
Excavation Dimensions: 35.5 m x 45.5 m
Section Cut: E-W

Ground Surface: Elev. 113.4 masl
Finished Floor: Elev. 109.2 masl
Base of Excavation: Elev. 108.7 masl
Water Table: Elev. 110.59 m
Drainage Layer: Elev. 108.7 m

Q Ground Water = 3,500 L/day
(S.F. = 1.5)

Q Infiltration = 2,500 L/day

Q Total= 6,000 L/day



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

SLIDEINTERPRET 7.031

Notes
Refer to Hydrogeological Report for factual information supporting this analysis.

Project **1-19-0719-46 I 2570 - 2590 Argyle Rd, Mississauga**

Analysis Dewatering, Long Term, Permeable

Date	Scale	File
06/24/2020	1:227	1-19-0719-46, 2020-06-23 - (1).slmd

By U.A

Ref.

Long-Term Proposed Dewatering Area 2

Material Name	Color	KS (m/s)
Earth Fill		1e-006
Clayey Silt (Glacial Till)		4.31e-007
Inferred Bedrock		1.49e-007

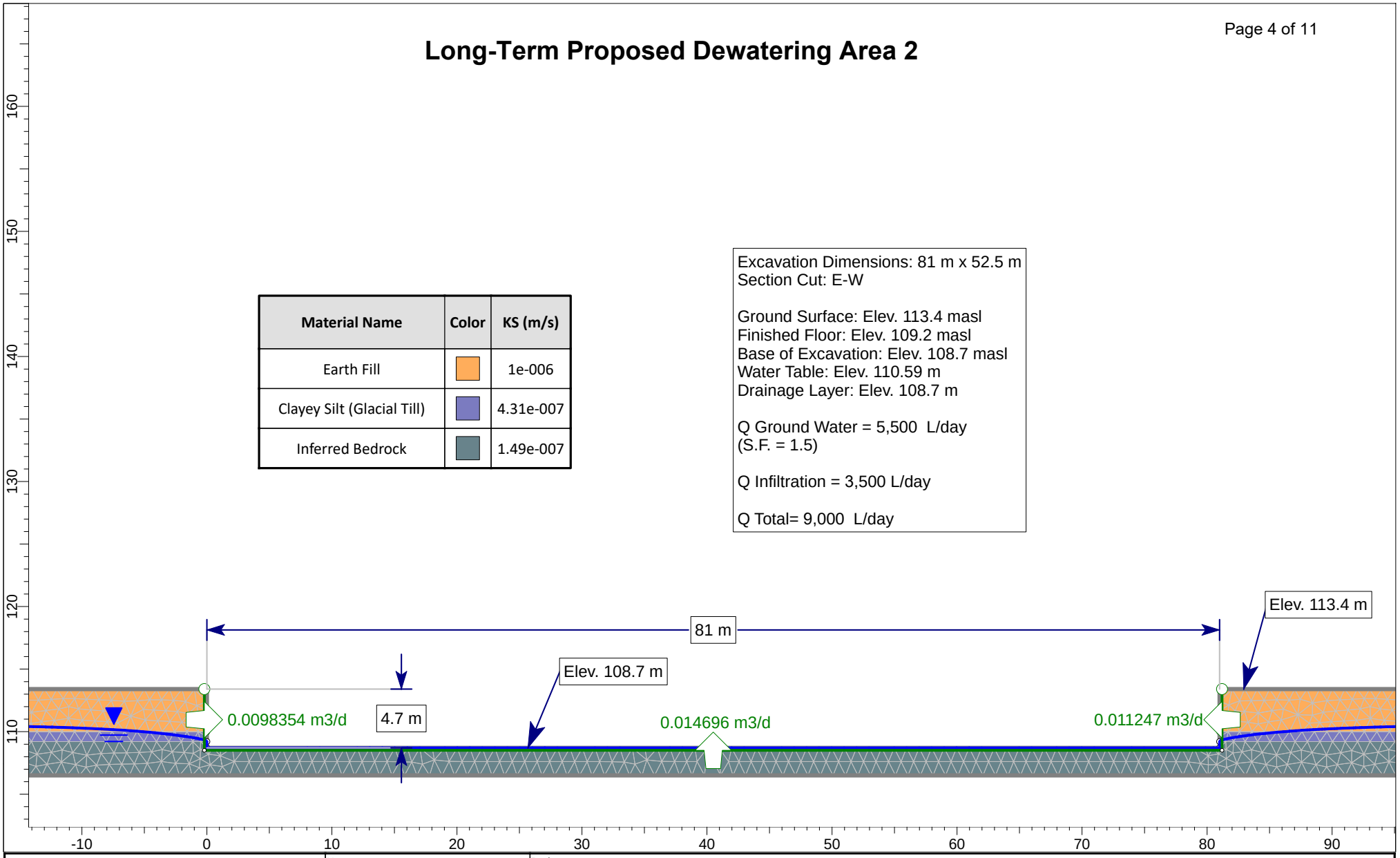
Excavation Dimensions: 81 m x 52.5 m
Section Cut: E-W

Ground Surface: Elev. 113.4 masl
Finished Floor: Elev. 109.2 masl
Base of Excavation: Elev. 108.7 masl
Water Table: Elev. 110.59 m
Drainage Layer: Elev. 108.7 m

Q Ground Water = 5,500 L/day
(S.F. = 1.5)

Q Infiltration = 3,500 L/day

Q Total= 9,000 L/day



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

SLIDEINTERPRET 7.031

Notes
Refer to Hydrogeological Report for factual information supporting this analysis.

Project **1-19-0719-46 I 2570 - 2590 Argyle Rd, Mississauga**

Analysis Dewatering, Long Term, Permeable

Date	Scale	File
06/24/2020	1:418	1-19-0719-46, 2020-06-23 - (2).slmd

By U.A

Ref.

Short-Term Construction Dewatering Flow Rate Estimate Details
Proposed Dewatering Area 1

Dewatering flow rate from Groundwater Source			
Excavation Dimensions			
NS (m)	45.5		
EW (m)	35.5	*Section Cut*	
Area (m^2)	1615.25		
Perimeter (m)	162		
Q BASE			
Flow (m^3/day)	**Length of Base (m)**	**Flow (L/day)**	
0.0128250	45.5	583.5375	
Q SIDES (m^3/day)			
Flow	**Perimeter (m)**	**Flow (L/day)**	
0.0148160	126.5	1874.224	
Q Total	L/day	2,457.76	
Safety Factor		1.5	
	L/day	3,686.64	
	L/day	**4,000.00**	

Dewatering Flow Rate from Rainfall Event		
Rainfall Event		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094
2 Year Event (L/day)	**40,381**	40,500
100 Year Event (L/Day)	**151,834**	152,000

Estimated Short-Term Dewatering Flow Rate (2 Year Event)

L/day	44,500.00
L/Sec	0.52

Short-Term Construction Dewatering Flow Rate Estimate Details
Proposed Dewatering Area 2

Dewatering flow rate from Groundwater Source

Excavation Dimensions		
NS (m)	52.5	
EW (m)	81	*Section Cut*
Area (m^2)	4252.5	
Perimeter (m)	267	

Q BASE		
Flow (m^3/day)	**Length of Base (m)**	**Flow (L/day)**
0.0149050	52.5	782.5125

Q SIDES (m^3/day)		
Flow	**Perimeter (m)**	**Flow (L/day)**
0.0191520	231.5	4433.688

Q Total	L/day	5,216.20
Safety Factor		1.5
	L/day	7,824.30
	L/day	**8,000.00**

Dewatering Flow Rate from Rainfall Event

Rainfall Event		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094
2 Year Event (L/day)	**106,313**	106,500
100 Year Event (L/Day)	**399,735**	400,000

Estimated Short-Term Dewatering Flow Rate (2 Year Event)

L/day	114,500.00
L/Sec	1.32

Long-Term Post Construction Dewatering Flow Rate Estimate Details
Proposed Dewatering Area 1

Dewatering Flow Rate flow rate from Groundwater Source

Excavation Dimensions	
NS (m)	45.5
EW (m)	35.5
Area (m^2)	1615.25
Perimeter (m)	162

Section Cut

Q BASE		
Flow (m^3/day)	**Length of Base (m)**	**Flow (L/day)**
0.0154210	45.5	701.66

Q SIDES (m^3/day)		
Flow	**Perimeter (m)**	**Flow (L/day)**
0.0123150	126.5	1,557.85

Q Total	L/day	2,259.50
Safety Factor		1.5
	L/day	3,389.25
	L/day	**3,500.00**

Dewatering Flow Rate from Rainfall Event

Infiltration		
Perimeter (m)	Slice (m)	rainfall event (m)
162	0.5	0.025

2 Year Event (L/day)	2,025
2 Year Event (L/day)	**2,500**

Estimated Long-Term Dewatering Flow Rate

L/day	6,000.00
L/Sec	0.07

Long-Term Post Construction Dewatering Flow Rate Estimate Details
Proposed Dewatering Area 2

Dewatering Flow Rate flow rate from Groundwater Source

Excavation Dimensions	
NS (m)	52.5
EW (m)	81
Area (m^2)	4252.5
Perimeter (m)	267

Section Cut

Q BASE

Flow (m^3/day)	Length of Base (m)	Flow (L/day)
0.0146960	52.5	771.54

Q SIDES (m^3/day)

Flow	Perimeter (m)	Flow (L/day)
0.0112470	231.5	2,603.68

Q Total	L/day	3,375.22
Safety Factor		1.5
	L/day	5,062.83
	L/day	**5,500.00**

Dewatering Flow Rate from Rainfall Event

Infiltration		
Perimeter (m)	Slice (m)	rainfall event (m)
267	0.5	0.025

2 Year Event (L/day)	3,338
2 Year Event (L/day)	**3,500**

Estimated Long-Term Dewatering Flow Rate

L/day	9,000.00
L/Sec	0.10

Dewatering Calculations
2570-2590 Argyle Road, Mississauga
Proposed Underground Services

Dewatering Rate Formula for an Unconfined Aquifer (Powers et al., 2007)

$$Q = \frac{\pi K (H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where:

- Q = Anticipated pumping rate (m^3/day)
- K = Hydraulic Conductivity (m/day)
- H = Distance from initial static water level to bottom of the saturated aquifer (m)
- h = Depth of water in the well while pumping (m)
- R_0 = Distance from a point of greatest drawdown to a point where there is no drawdown (Radius of influence) (m
- r_s = Distance to the wellpoints from the centre of the trench (m), assumed to be half of the trench widtl
- x = Trench Length (m)
- L = Distance from a line source to the trench, equivalent to R_0 (m)

Parameter	Units	Proposed Storm Sewer Value	Proposed Sanitary Sewer Value
Q	**m^3/day**	0.048	0.727
K	**m/day**	0.04	0.04
H	**m**	0.7	1.7
h	**m**	0.1	0.4
R_0	**m**	6.2	9.3
Trench width (b)	**m**	2	2
r_s	**m**	1.0	1.0
x (a)	**m**	4.0	55.7
L	**m**	6.2	9.3
	a/b	2.0	27.9

Considering a factor of safety of 1.5

Required Dewatering Rate:

Q (Proposed Storm Sewer)= 72.2 L/day

Q (Proposed Sanitary Sewer = 1,090.0 L/day

Radius of Influence Formula (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

a/b>1.5 Trench Dewatering
a/b<1.5 Single Well Dewatering

Where:

- R_0 = Radius of Influence (m), beyond which there is negligible drawdowr
- H = Distance from initial static water level to bottom of saturated aquifer (m)
- K = Hydraulic conductivity (m/s)
- S_y = Specific yield of the aquifer formation
- t =Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)

Parameter	Units	Value	Value
R_0	**m**	6.2	9.3
H	**m**	0.7	1.7
K	**m/s**	4.3E-07	4.3E-07
S_y		0.06	0.06
t	**s**	1209600	1209600

Short-Term Construction Dewatering Flow Rate Estimate Details
Proposed Storm Sewer Alignment

Dewatering flow rate from Groundwater Source

Excavation Dimensions	
NS (m)	2
EW (m)	4
Area (m^2)	8
Perimeter (m)	16

Total Flow (m^3/day)	**Flow (l/day)**
0.07	72.20

Dewatering Flow Rate from Rainfall Event

Rainfall Event		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094
2 Year Event (L/day)	**200**	200
100 Year Event (L/Day)	**752**	800

Estimated Short-Term Dewatering Flow Rate

2 Year Event (L/day)	**272.20**
100 Year Event (L/day)	**872.20**

Short-Term Construction Dewatering Flow Rate Estimate Details
Proposed Sanitary Sewer Alignment

Dewatering flow rate from Groundwater Source

Excavation Dimensions	
NS (m)	55.7
EW (m)	2
Area (m^2)	123.2
Perimeter (m)	250.4

Total Dewatering Flow Rate (Appendix G Page 1 of 3)

Total Flow (m^3/day)	Flow (l/day)
1.18	1,100.00

Dewatering Flow Rate from Rainfall Event

Rainfall Event		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094
2 Year Event (L/day) for Excavation Trench	**2,785**	2,800
100 Year Event (L/Day) for Excavation Trench	**11,581**	11,600

Estimated Short-Term Dewatering Flow Rate

2 Year Event (L/day)	**3,900**
100 Year Event (L/day)	**12,780.00**